Annual Report of Activities

June 5, 2009 to September 30, 2010

Photo credit: John Hannon

Stanislaus Operations Group (SOG)

October 2010

Acronyms and Abbreviations

3DADM	Three-Day-Average Daily Maximum temperature
7DADM	Seven-Day-Average Daily Maximum temperature
BiOp	Biological Opinion
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CDEC	California Data Exchange Center
CDFG	California Department of Fish & Game
CWT	Coded Wire Tag
DWR	California Department of Water Resources
ESA	Endangered Species Act
GDW	Stanislaus River at Goodwin Dam (CDEC gauge)
KF	Knights Ferry
NMFS	National Marine Fisheries Service
OBB	Stanislaus River at Orange Blossom Bridge (CDEC gauge)
OID	Oakdale Irrigation District
Reclamation	U.S. Bureau of Reclamation
RPA	Reasonable and Prudent Alternative
RPN	Stanislaus River at Ripon (CDEC gauge for dissolved oxygen)
SOG	Stanislaus Operations Group
SRMFFN	Stanislaus River Minimum Flows for Fishery Needs
SSJID	South San Joaquin Irrigation District
SWP	State Water Project
SWRCB	State Water Resources Control Board
USFWS	U.S. Fish & Wildlife Service
VAMP	Vernalis Adaptive Management Program
WOMT	Water Operations Management Team

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Chapter 1 – Background

1.1 Background

The Stanislaus River is a significant resource of considerable interest to fishery management agencies, the public, and Reclamation. The United States Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), California Department of Fish and Game (CDFG), and State Water Resource Control Board (SWRCB), are agencies with trust responsibilities for fishery and water resources in the Stanislaus River. Reclamation is responsible for operating the East Side Division which includes New Melones Dam and Powerplant. Tri-Dam Project, a partnership between the Oakdale Irrigation District and the South San Joaquin Irrigation District, owns and operates Donnells and Beardsley Dams and Reservoirs upstream of New Melones Reservoir and Tulloch Dam and Reservoir downstream of New Melones Reservoir. Oakdale Irrigation District and South San Joaquin Irrigation District own Goodwin Dam and Reservoir located downstream of Tulloch Dam. The East Side Division is operated to provide flood control, irrigation, power generation, general recreation, water quality, and fish and wildlife enhancement[1].

On June 4, 2009, NMFS issued its Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project (NMFS BiOp)[2]. The NMFS BiOp included the requirement that Reclamation create the Stanislaus Operations Group (SOG). The SOG is a technical team that provides advice to NMFS and to the Water Operations Management Team (WOMT) on issues related to fisheries and water resources on the Stanislaus River, per the decision-making procedures outlined on pages 582-583 of the NMFS BiOp.

The purpose of the SOG is "to gather and analyze information, and make recommendations, regarding adjustments to water operations within the range of flexibility prescribed in the implementation procedures"[3] for the Stanislaus River and for the operation of the East Side Division as a unit of the overall CVP which is consistent with all relevant laws, regulations, and standards including the NMFS BiOp. Reclamation maintains its authority and responsibility for operations of the East Side Division complex. The SOG has no authority to make operational decisions, but rather provides advice to NMFS and WOMT. NMFS will consider advice from SOG when making a final determination as to whether or not a proposed operational action is consistent with the NMFS BiOp and ESA obligations.

[1] PL 78–534 and PL 87-874
[2] The NMFS BiOp is available online at: http://swr.nmfs.noaa.gov/ocap.htm
[3] NMFS BiOp at p.581.

1.2 Membership

The SOG consists of representatives from Reclamation, USFWS, NMFS, CDFG, DWR, and the SWRCB. Other agencies may be added to the SOG provided existing agencies approve of the change in SOG membership. Stanislaus Operations Group (SOG) member agencies and the lead contacts are:

Bureau of Reclamation (Reclamation)

Randi Field – Stanislaus Operator

Matt See – SOG group coordinator

U. S. Fish and Wildlife Service (USFWS)

J.D. Wikert

Nick Hindman

National Marine Fisheries Service (NMFS)

Barb Byrne

Rhonda Reed

California Department of Fish and Game (CDFG)

Tim Heyne

California Department of Water Resources (DWR)

Andy Chu

Dan Yamanaka

State Water Resources Control Board (SWRCB)

Kari Kyler

Greg Wilson

Chapter 2 – Summary of SOG Discussions

The following agenda items were discussed at monthly SOG meetings from January 2010 (the first SOG meeting) through September 2010. Meeting notes and supplemental SOG documents[4] are posted on the SOG website: http://swr.nmfs.noaa.gov/ocap/sog.htm.

2.1 Monthly Discussion Topics

- Fish monitoring
- Water operations and water quality (flows measured at Goodwin Dam, temperatures at OBB and KF)
- Stanislaus RPA Actions (NMFS BiOp at pages 619-628); key actions summarized below:

Temperature management -- RPA Action III.1.2 (NMFS BiOp at p. 620): This RPA calls for Reclamation to manage the cold water supply within New Melones Reservoir and make cold water releases from New Melones Reservoir to provide suitable temperatures for CV steelhead rearing, spawning, egg incubation, smoltification, and adult migration in the Stanislaus River downstream of Goodwin Dam.

Flow management -- RPA Action III.1.3 (NMFS BiOp at p. 622): This RPA calls for Reclamation to operate releases from the East Side Division reservoirs according to the yeartype-specific minimum flow schedules in Appendix 2-E of the NMFS BiOp.

Gravel augmentation -- RPA Action III.2.1 (NMFS BiOp at p. 626): This RPA calls for Reclamation to minimize effects of water operations on the Stanislaus River through improving spawning habitat for steelhead trout (*Oncorhynchus mykiss*). On June 30, 2010, Reclamation submitted to the National Marine Fisheries Service a plan[5] which outlines projects that aim to achieve placement of 50,000 cubic yards of gravel on the Stanislaus River by 2014. This plan includes project descriptions for projects scheduled or likely to occur (e.g., Honolulu Bar, Goodwin Canyon, Lover's Leap), implementation schedules and monitoring efforts to improve spawning habitat. Project descriptions for potential projects may help to meet the gravel augmentation requirements under this action, but are in various stages of development, are also described (e.g., Knights Ferry, Two Mile Bar, Horseshoe Recreation Area, and Valley Oak Restoration Area).

Floodplain Restoration -- RPA Action III.2.2 (NMFS BiOp at p. 627): This RPA calls for Reclamation to seek advice from SOG to develop an operational strategy to achieve floodplain inundation flows that inundate CV steelhead juvenile rearing habitat on a one- to three-year return schedule, and to submit a proposed plan of operations to achieve this flow regime by June 2011. During 2010, SOG discussed several ongoing or proposed floodplain restoration

[4] A summary of supplemental documents available on the SOG webpage is provided in Appendix A.
[5] The plan for gravel augmentation is available on the SOG webpage: http://swr.nmfs.noaa.gov/ocap/sog.htm

projects (e.g. Honolulu Bar, Lovers Leap, and Two Mile Bar) which provide several ecological benefits such as: providing refuge from predators, producing additional food resources, improving vegetative contaminant removal, promoting natural riparian recolonization of woody species which can reduce water temperatures, attenuating flood flows, increasing groundwater recharge, and cleaning instream gravels through deposition of fine sediments on the floodplain. These projects can also provide local gravel for meeting the requirements of Action III.2.1, minimizing the need to import gravel from other watersheds and reducing transportation costs. Projects which restore floodplain and side-channel habitats can increase the acres of seasonally inundated habitats necessary for rearing salmonids without requiring changes to the existing hydrograph.

SOG expects that Action III.2.4 will be addressed by the Interagency Fish Passage Steering Committee.

2.1 Other Discussion Topics

The following list of SOG discussion topics highlights some additional substantive issues reviewed by SOG over the past year. Minor or logistical discussion items are documented in the notes, but not listed here.

- Parameters to shape a managed pulse in a way that mimics a natural "storm pulse"
- Effects of flow ramping rates on recruitment of riparian vegetation
- Need for additional monitoring/experimental data to understand how fish behave in response to particular flows/temperatures
- Public outreach and stakeholder communication
- Draft SOG Charter and draft SOG Memorandum of Agreement

Chapter 3 – Water Operations Summary

This chapter briefly describes Stanislaus River operations for years 2009 and 2010, pertaining to RPA Actions III.1.2 and III.1.3. These Actions are presented in reverse order for clarity.

3.1 Action III.1.3 – Operate the East Side Division Dams to Meet the Minimum Flow, as Measured at Goodwin Dam, Characterized in Figure 11-1, and as Specified in Appendix 2-E[6]

Figure A is a summary of Goodwin Dam river releases and New Melones Lake storage for June 2009 through September 2010. Throughout this period, New Melones storage has been at approximately 50% capacity and operations have not been affected by the allowable storage/flood control. The Stanislaus River Minimum Flows for Fish Needs (SRMFFN) prescribed in Appendix 2-E is also shown in the figure. The water year classification for

[6] Appendix 2-E of the NMFS BiOp is available online at: http://swr.nmfs.noaa.gov/ocap.htm

Appendix 2-E, based on the New Melones Index, for both years 2009 and 2010 is calculated as "Dry". A final determination of the water year classification calculation method and implementation is currently under review (discussed in section 5.1 below). In the interim, the New Melones Water Supply Parameter was calculated by using the Interim Plan of Operations (IPO) framework (SOG meeting notes from February 17, 2010).

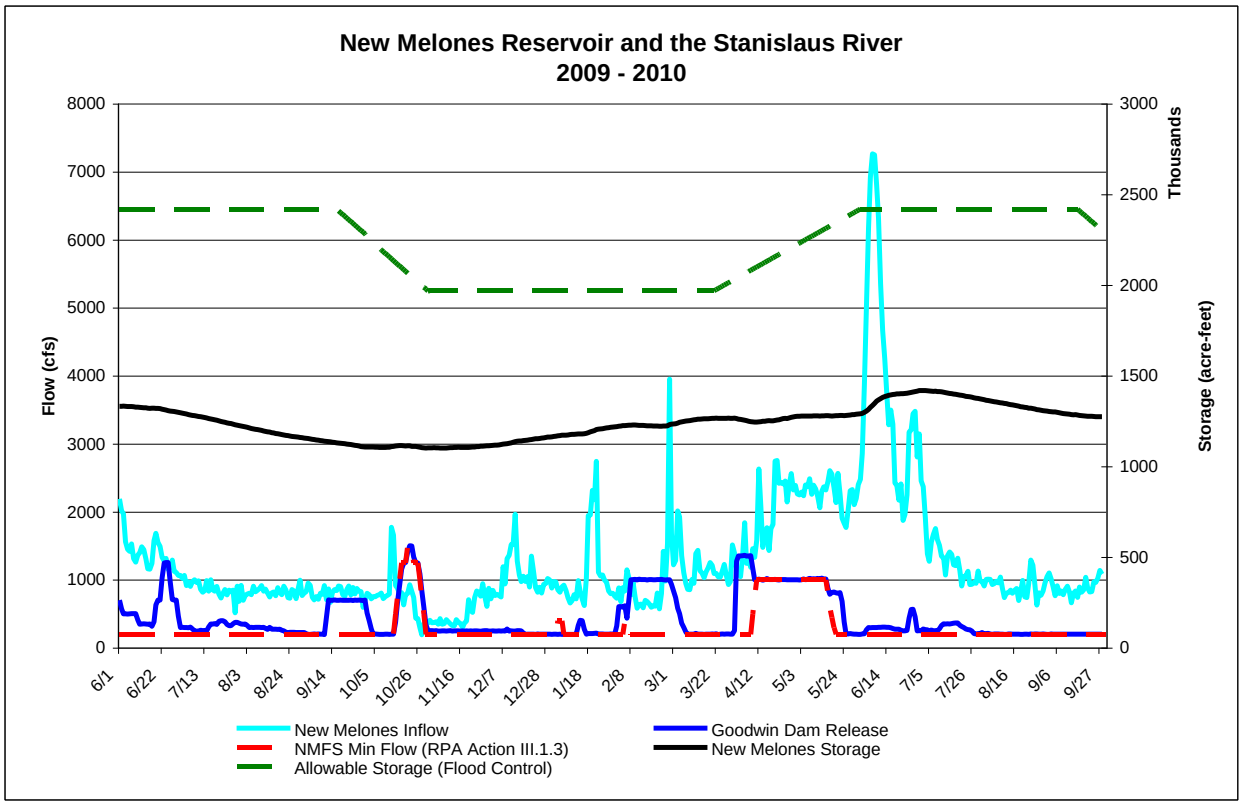

Figure A: Summary of New Melones Reservoir and the Stanislaus River Flows

The Goodwin Dam release to the Stanislaus River and SRMFFN are shown again in Figure B. In addition, the primary reasons for release changes to the Stanislaus River are identified on the figure.

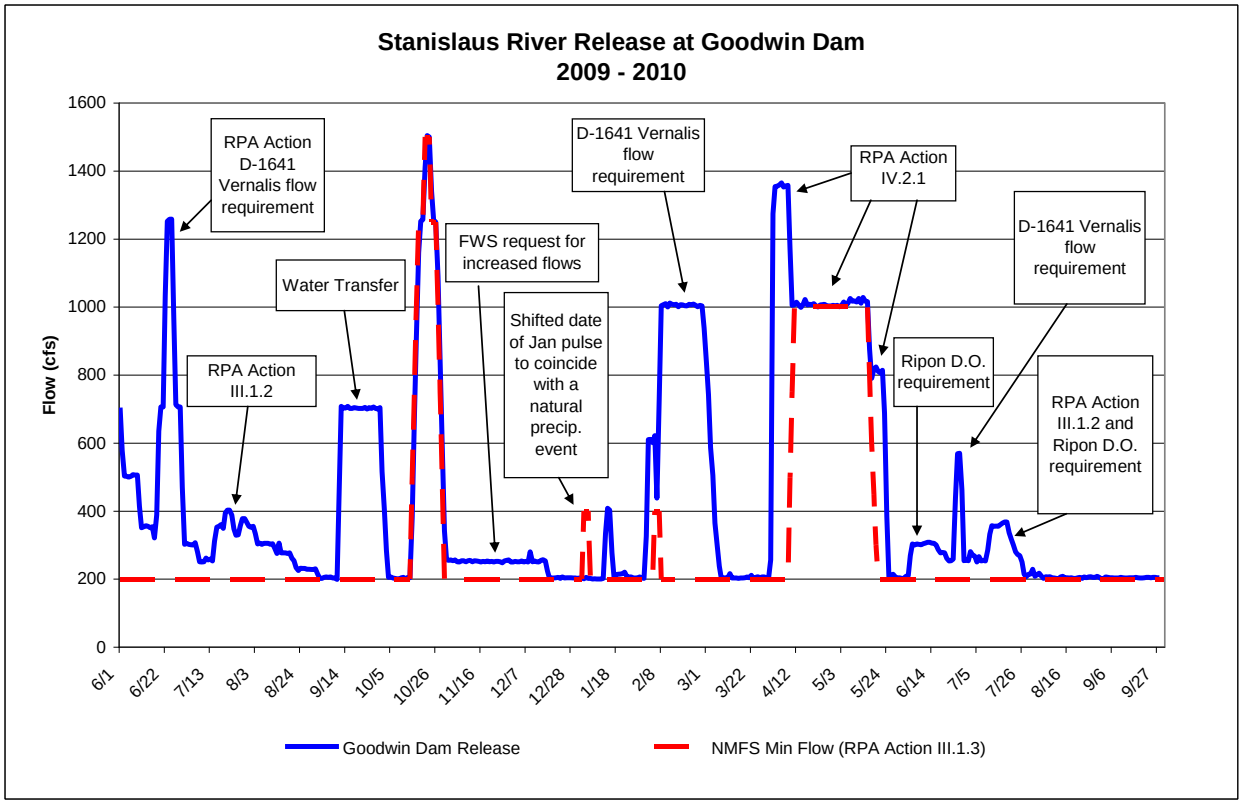

Figure B: Summary of Stanislaus River Release at Goodwin Dam

Table A contains a summary of release changes from Goodwin Dam indicating the purpose of the operational change. Reclamation has made provisions to notify the public of potential safety or high flow considerations such as inundation and seepage as appropriate. A press release was issued in March of 2010 when flows were uncharacteristically high in a non-flood control period.

Table A: Release Changes at Goodwin Dam

Start Date	End Date	Release	Comment
06/18/09	06/19/09	Increase	Operating to NMFS BiOp (D-1641 Vernalis flow requirement)
06/19/09	06/22/09	Decrease	Reduce flows for weekend: high flow concerns
06/26/09	06/26/09	Decrease	Reduce flows for weekend: high flow concerns
06/30/09	06/30/09	Decrease	Operating to D-1614 Vernalis Bay-Delta flow requirement
07/07/09	07/07/09	Decrease	Reducing flows to minimum flow requirement
07/15/09	07/15/09	Increase	Operating to NMFS BiOp III.1.2. temperature management
07/20/09	07/20/09	Increase	Operating to NMFS BiOp III.1.2. temperature management
07/23/09	07/23/09	Increase	Operating to NMFS BiOp III.1.2. temperature management
07/24/09	07/24/09	Decrease	Storage conservation and temperature management
07/27/09	07/30/09	Increase	Operating to NMFS BiOp III.1.2. temperature management

08/03/09	08/03/09	Decrease	Storage conservation and temperature management
08/12/09	08/12/09	Decrease	Storage conservation and temperature management
08/20/09	08/20/09	Decrease	Storage conservation and temperature management
08/22/09	08/22/09	Decrease	Storage conservation and temperature management
09/01/09	09/01/09	Decrease	Storage conservation
09/11/09	09/11/09	Increase	Water transfer
10/01/09	10/03/09	Decrease	Water transfer
10/15/09	10/30/09	Increase	Operating to NMFS BiOp III.1.3
10/30/09	10/30/09	Increase	FWS request for increased flows following NMFS BiOp pulse
12/17/09	12/17/09	Decrease	Operating to NMFS BiOp III.1.3
01/13/10	01/16/10	Increase	Operating to NMFS BiOp III.1.3 (dates adjusted to coincide with natural precipitation event)
02/01/10	02/01/10	Increase	Operating to D-1614 Vernalis Bay-Delta flow requirement
02/05/10	02/07/10	Increase	Operating to NMFS BiOp III.1.3
02/07/10	02/07/10	Increase	Operating to D-1614 Vernalis Bay-Delta flow requirement
02/28/10	02/28/10	Decrease	Operating to D-1614 Vernalis Bay-Delta flow requirement
03/01/10	03/07/10	Decrease	Operating to D-1614 Vernalis Bay-Delta flow requirement
03/31/10	04/01/10	Increase	Operating to NMFS BiOp IV.2.1
04/09/10	04/09/10	Decrease	Operating to NMFS BiOp IV.2.1
05/16/10	05/17/10	Decrease	Operating to NMFS BiOp IV.2.1
05/23/10	05/24/10	Decrease	Operating to NMFS BiOp IV.2.1
06/04/10	06/04/10	Increase	Operating to Ripon Dissolved Oxygen requirement
06/17/10	06/17/10	Decrease	Operating to Ripon Dissolved Oxygen requirement
06/21/10	06/21/10	Decrease	Operating to Ripon Dissolved Oxygen requirement
06/25/10	06/29/10	Increase	Operating to D1641 Vernalis flow objective
07/10/10	07/10/10	Increase	Operating to NMFS BiOp III.1.2. temperature management
07/11/10	07/11/10	Increase	Operating to NMFS BiOp III.1.2. temperature management
07/19/10	07/19/10	Decrease[7]	Operating to NMFS BiOp III.1.2. temperature management
07/21/10	07/21/10	Decrease	Operating to Ripon Dissolved Oxygen requirement and NMFS BiOp III.1.2 temperature management
07/23/10	07/23/10	Decrease	Operating to Ripon Dissolved Oxygen requirement and NMFS BiOp III.1.2 temperature management
07/26/10	07/26/10	Decrease	Operating to Ripon Dissolved Oxygen requirement and NMFS BiOp III.1.2 temperature management
07/27/10	07/27/10	Decrease	Operating to Ripon Dissolved Oxygen requirement and NMFS BiOp III.1.2 temperature management

[7] A "Decrease" in releases is attributed to NMFS BiOp III.1.2 temperature management (perhaps jointly with the Ripon Dissolved Oxygen requirement) whenever a flow greater than the minimum SRMFFN is required to meet the temperature target.

3.2 Action III.1.2 Provide Cold Water Releases to Maintain Suitable Steelhead Temperatures

Figures C and D are summaries of temperature operations from June 2009 through September 2010. These graphs identify periods where temperatures exceeded the temperature criterion and where the temperature exception was triggered. Temperature exception notifications were provided by Reclamation for NMFS approval, with input from members of the SOG. These exceptions are summarized in the section below.

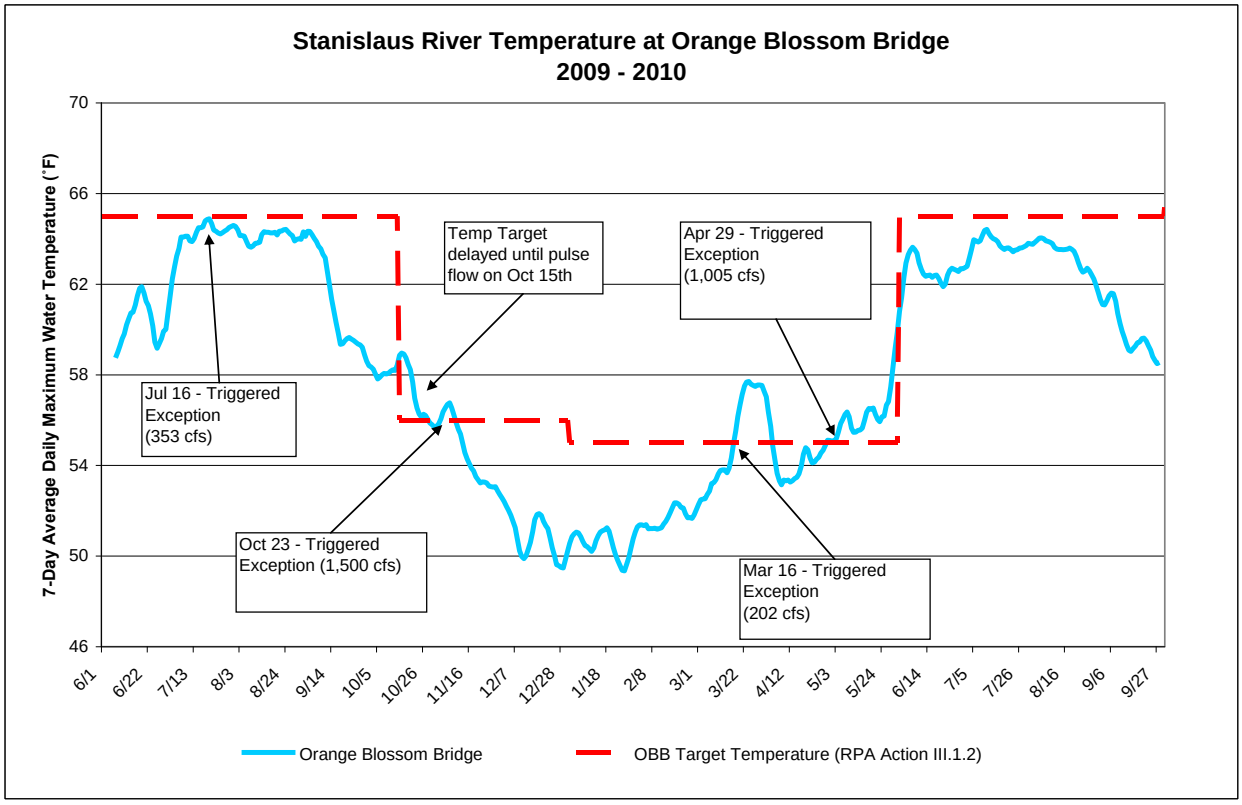

Figure C: Summary of Temperature at Orange Blossom Bridge

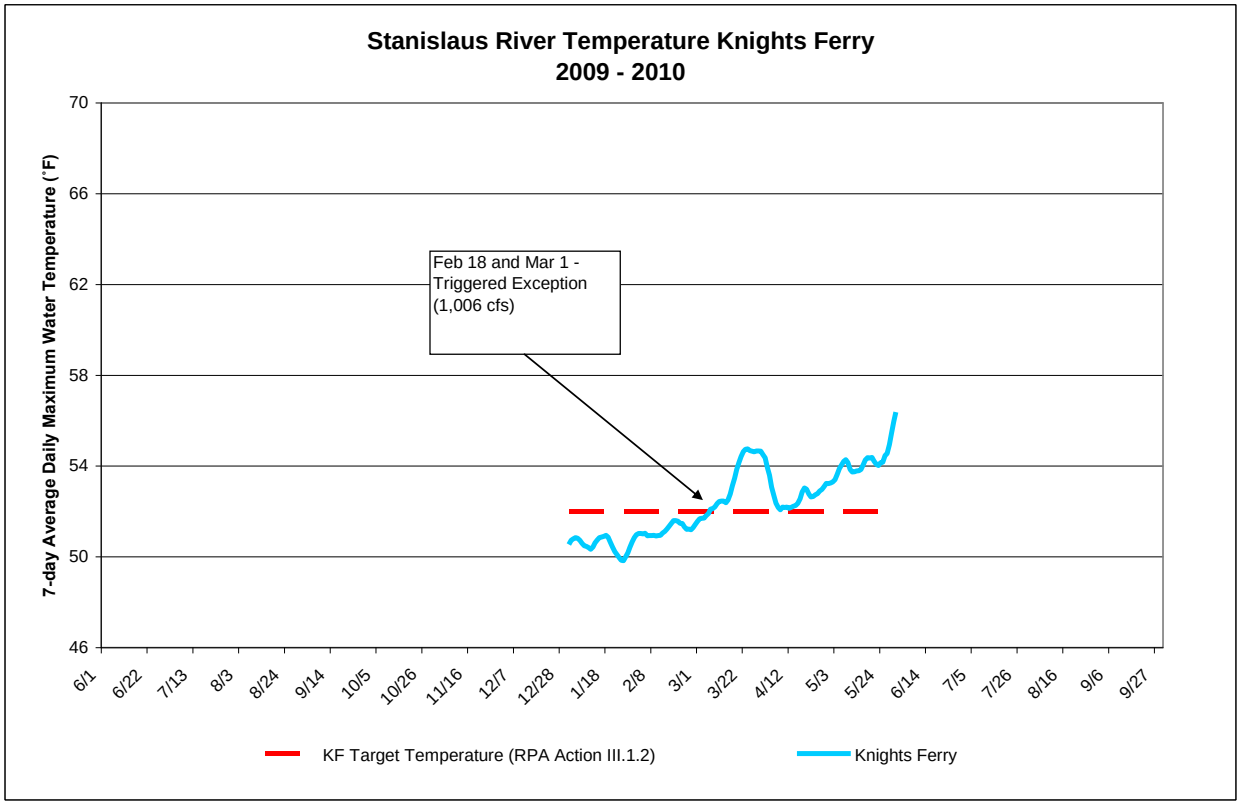

Figure D: Summary of Temperatures at Knights Ferry

Summary of Year 2009-2010 NMFS BiOp RPA Action III.1.2 Exceptions

The NMFS BiOp describes suitable temperatures for Central Valley (CV) steelhead life-stages on the Stanislaus River under RPA Action III.1.2. The temperature criteria, measured at both Orange Blossom Bridge and Knights Ferry are based on a seven-day average daily maximum temperature (7DADM).

Stanislaus River temperatures are influenced by the upstream reservoir systems at Goodwin Dam, Tulloch Dam, and New Melones Dam (additional reservoir systems further upstream are assumed to have minimal effect on water temperature due to the size of New Melones Reservoir). Temperature control devices or other physical structures are not available to manage for temperature blending at these facilities. The outlet controls at both New Melones and Tulloch typically draw the coolest water available in those reservoirs. However, water entering the Stanislaus River spills from over the top of Goodwin Dam which is likely the warmest water within Goodwin reservoir. In the series of reservoirs (New Melones, Tulloch, and Goodwin) downstream temperature can be influenced with increased flows from Goodwin Dam. However, there may be operational limitations to utilizing additional water due to conflicts with Reclamation's obligations served by New Melones Reservoir storage. When possible, temperature simulation modeling was used to evaluate in-stream temperatures and guide

temperature management decisions. If additional releases to achieve temperature targets conflict with Reclamation's nondiscretionary requirements, the NMFS RPA provides an exception procedure.

The temperature exception requires Reclamation to notify NMFS if the temperature target is expected to exceed based on a three-day average daily maximum. Reclamation is also required to provide an evaluation of the conditions and identify conflicts. Reclamation has sent e-mail notifications/determinations to NMFS containing the following information:

- Compliance location exceeding temperature target
- Date the three-day average daily maximum temperature (3DADM) was exceeded
- A table of recent maximum daily temperatures
- Current Goodwin Dam releases
- Expectation of temperature target exceedence
- Temperature management conflict rationale
- Historical water temperature downstream of Goodwin Dam
- Simulated Temperature Outlook (using a stand-alone Stanislaus River six-hour time-step temperature model) at a 90% or 50% hydrology runoff exceedence probability for Orange Blossom Bridge and Knights Ferry (Includes expected allocation and delivery pattern and an assumed historical meteorological condition.)

[Note that not all notifications included each of the above components, but the notifications have since evolved to this list.]

Reclamation has submitted five temperature notifications (Appendix B). A summary of the notification information is presented in Table B:

Table B: Summary of RPA Action III.1.2 Exceptions

Date	Location	Goodwin Dam Release (cfs)	Duration of Temperature Exceedence 7DADM (Days)	Maximum 7DADM Temperature of Exceedence Duration (°F)	Target 7DADM Temperature (°F)	Rationale -Operational conflict
16-Jul-09	Orange Blossom Bridge	353	0	NA	65	Triggered 3DADM, however, additional flows released for temperature management did not trigger the 7DADM
23-Oct-09	Orange Blossom Bridge	1,500	13	56.8	56	Increased flows at 1,500 cfs unable to meet temperature target - no additional releases made - New Melones storage and future cold water pool concerns.
18-Feb-10[8]	Knights Ferry	1,006	86	56.4	52	Increased flows at 1,000 cfs unable to meet temperature target - no additional releases made - New Melones storage and future cold water pool concerns.
16-Mar-10	Orange Blossom Bridge	202	17	57.7	55	Because higher flows in early spring did not yield temperature protection - no additional releases made - New Melones storage and future cold water pool concerns.
29-Apr-10	Orange Blossom Bridge	1,005	33	59.8	55	Increased flows at 1,000 cfs unable to meet temperature target - no additional releases made - New Melones storage and future cold water pool concerns.

[8] Knights Ferry temperatures were estimated beginning in January 2010 with coarse data. In March 2010, after receiving an expanded historical data set from CDFG, a second more refined Knights Ferry relationship was developed. The graphics reflect the second, more refined, relationship. On February 18, 2010 the previous relationship indicated the temperature exceeded on a 3-day average daily maximum and a notification was sent out to NMFS. The revised relationship indicates the 3-day average daily maximum was not triggered on February 18, but was triggered on March 1. Because an exception notification had already been submitted in February, no new notification was submitted.

Chapter 4 – Summary of selected Stanislaus Fish Monitoring Data

Figure E plots the flow at Ripon and Goodwin Dam compared to the number of Chinook salmon caught in the Stanislaus River Weir (aka Alaskan weir, portable resistance board weir) in 2009. Six *O. mykiss* were observed at the weir during this period in 2009 (one individual observed on 9/18, 9/19, 10/14, and 11/12; two individuals observed on 9/25). This graph and the weir data were provided by FishBio, the operator of the Stanislaus weir.

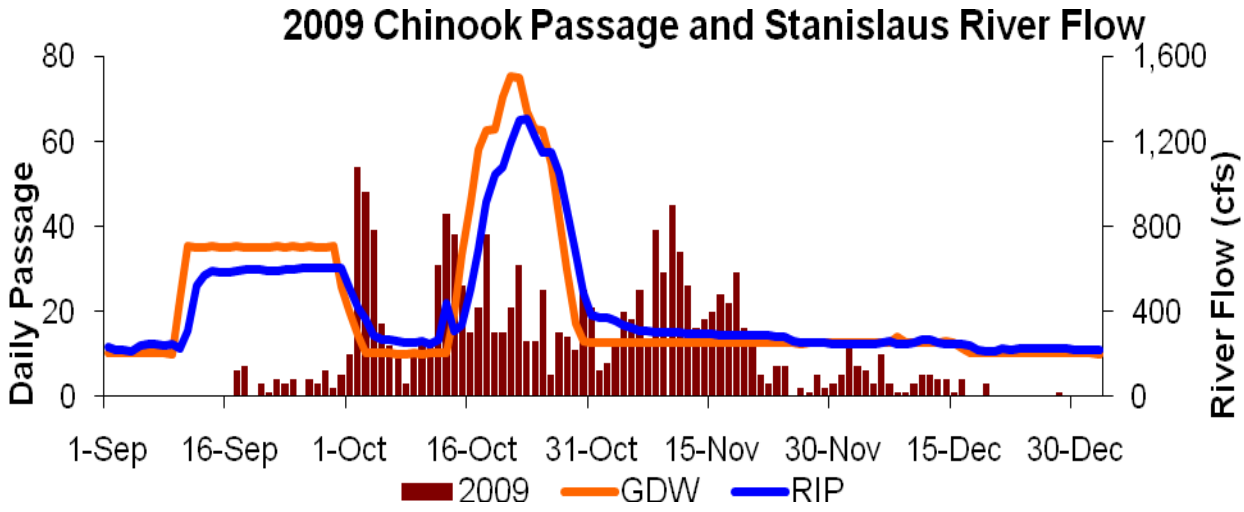

Figure E: Chinook Passage and Stanislaus River Flow 2009

Figure F reports the number of Chinook salmon that have been observed at the Stanislaus weir by 10/03/10 from 2003 to 2010. These data, provided by FishBio, are available on a weekly basis and can help to indicate both the abundance, and relative timing, of migrating Chinook in the Stanislaus basin compared to previous years. No *O. mykiss* have yet been observed at the weir in 2010.

Year	Net Passage At the Stanislaus Weir by 10/03
2010	117
2009	112
2008	141
2007	28
2006	153
2005	135
2004	23
2003	430

Figure F: Net Upstream Passage of Chinook salmon at the Stanislaus Weir by October 3rd, from 2003 to 2010

The following figure (Figure G) compares the Chinook salmon passage at the Stanislaus River Weir from 2003 to 2010. This graph and the weir data were provided by FishBio.

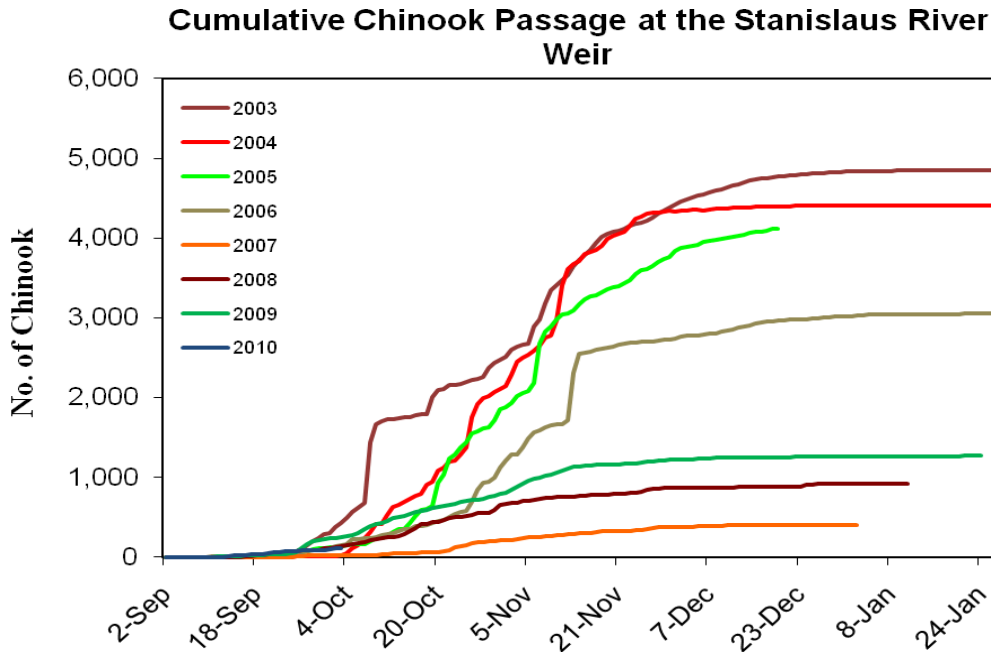

Figure G: Cumulative Chinook Passage at the Stanislaus River Weir

Figure H plots the flow at Ripon, CA (RIP) and daily Chinook salmon catch and days of operation for the rotary screw trap at Caswell Memorial State Park on the lower Stanislaus River from January to June 2010. Just one *O. mykiss* was recorded at the Caswell rotary screw traps during this period, on 5/14/2010. This graph and the data were provided by Cramer Fish Sciences through funding by FWS.

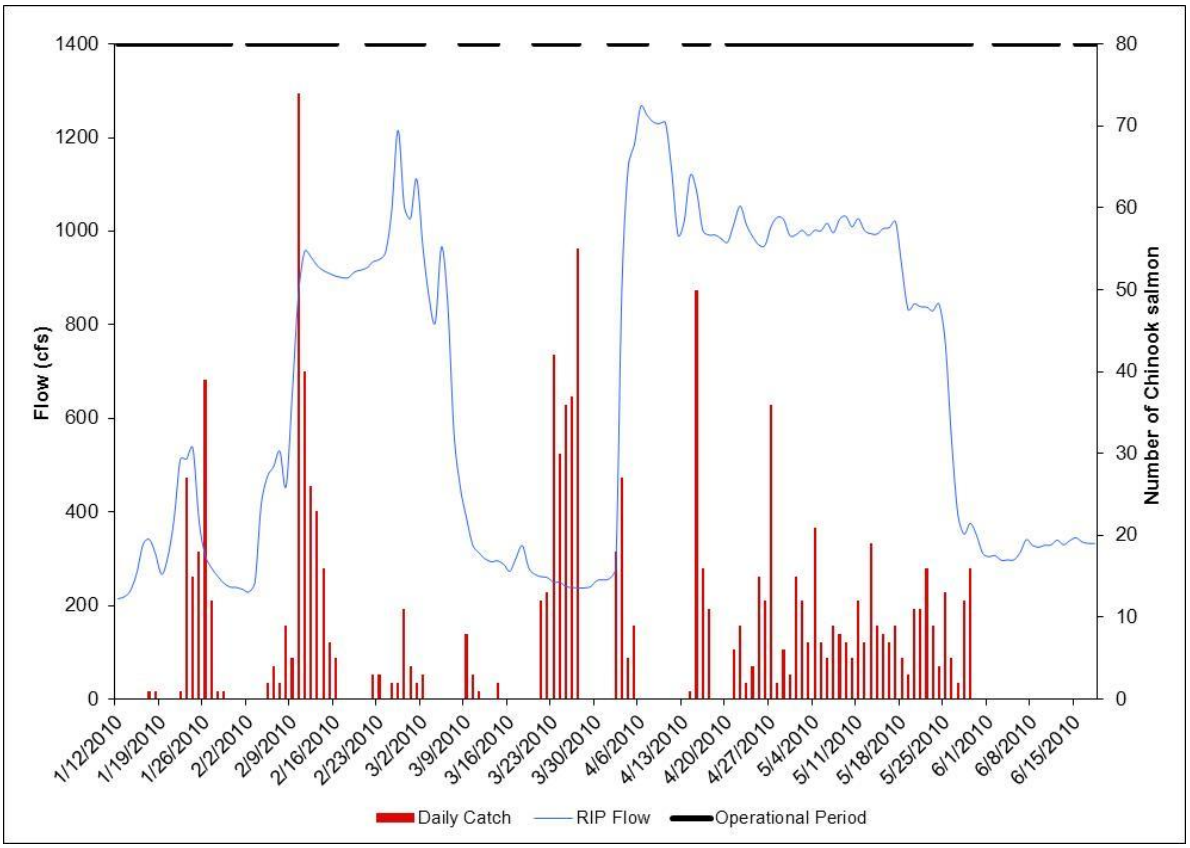

Figure H: Summary of Fish Sampling at the Caswell Rotary Screw Trap.

Chapter 5 – Year in Review and Requests for Feedback

5.1 Clarifications during 2010

During the first year of implementation of the Stanislaus RPA actions, SOG found that some RPA actions needed further clarification. Those clarifications are summarized below.

Action III.1.2 – Temperature management

Multiple temperature criteria: From January 1 to May 31, Action III.1.2 sets temperature criteria for two locations along the Stanislaus River: Orange Blossom Bridge[9] and Knights Ferry. There are two temperature criteria listed at Orange Blossom Bridge during this period; a 55^0F criterion to provide temperatures suitable for spawning and incubation of CV steelhead, and a 57^0F criterion to provide temperatures suitable for smoltification. NMFS clarified that temperature should be managed to the 55^0F criterion at Orange Blossom Bridge (OBB) in order to protect spawning and incubation during this period, and to the 52^0F criterion at Knights Ferry (upstream of OBB).

Knights Ferry temperature: Real-time temperature data from the gauge at Knights Ferry are not accessible via CDEC. In order for Reclamation to manage to the Knights Ferry temperature criterion, the daily maximum temperature at Knights Ferry was estimated using a regression equation based on the observed relationship between temperatures at Knights Ferry and Orange Blossom Bridge.

Action III.1.3 – Flow management

The flow schedules in Appendix 2-E of the NMFS BiOp specify the minimum instream flow at Goodwin Dam[10], by water year type. While both Reclamation (employing the Interim Plan of Operations (IPO) framework[11]) and NMFS (under the framework used to develop the RPA) determine year type based on the specific hydrology of the Stanislaus basin, by using the New Melones Index (a.k.a. the New Melones Water Supply Parameter), the calculation of yeartype under the IPO framework and the RPA do differ and may result in different yeartype designations. NMFS provided a handout to SOG in January 2010 clarifying these differences and a summary of those differences is provided in Appendix C. SOG has discussed the issue and is currently reviewing the yeartype calculation method; however a final determination has not yet been made. Additional information in Appendix C was presented to NMFS for

[9] "OBB" on CDEC
[10] "GDW" on CDEC
[11] Reclamation is operating New Melones for the NMFS BiOp RPA Actions. The use of the "IPO framework" is limited to the calculation of water year type.

consideration in their official clarification notice: (1) an evaluation of reservoir releases using the 50% and 90% runoff exceedence forecast information, and (2) an alternate proposal for updating the water supply parameter used to implement RPA Action III.1.3.

Action III.2.1 – Gravel Augmentation

The description of Action III.2.1 in the NMFS BiOp refers to the "…addition of 50,000 tons of gravel by 2014." This sentence should read "…addition of 50,000 cubic yards of gravel by 2014," to match the intended units as indicated in the header for Action III.2.1.

5.2 Issues that arose in 2010 and are likely to be revisited by SOG in 2011

SOG also had some discussions regarding implementation of the Stanislaus RPA actions that are still ongoing. Brief summaries are provided below.

An "inverted" spring pulse due to the interaction of between Action III.1.3 (Stanislaus minimum flows), Action IV.2.1 (a Vernalis flow requirement),and the timing of the 2010 VAMP flows.

The Vernalis flow component of Action IV.2.1, in 2010, called for a minimum Vernalis flow of 3,000 cfs from April 1st through May 31st. Action III.1.3 called for a spring pulse flow below Goodwin Dam that peaked at 1,000 cfs by mid-April and dropped back down to 200 cfs in mid-May. The 2010 VAMP pulse ran from late April through late May. Outside of the VAMP period, high releases on the Stanislaus were required to meet the Vernalis flows under Action IV.2.1 (releases were not only higher than required under Action III.1.3, but were actually higher than the peak flow of the upcoming pulse). During the VAMP period, contributions from the Merced helped to meet the necessary Vernalis flow, and releases on the Stanislaus dropped to the peak flow of the spring pulse. After the VAMP period, but before the end of the required 3337 cfs Vernalis flow (in May the D-1641 was greater than the NMFS requirement of 3,000 cfs), releases on the Stanislaus increased again to levels higher than the peak flow schedule under Action III.1.3. This preliminary estimation and interaction of several RPA actions with the VAMP study flow is summarized in Figure I.

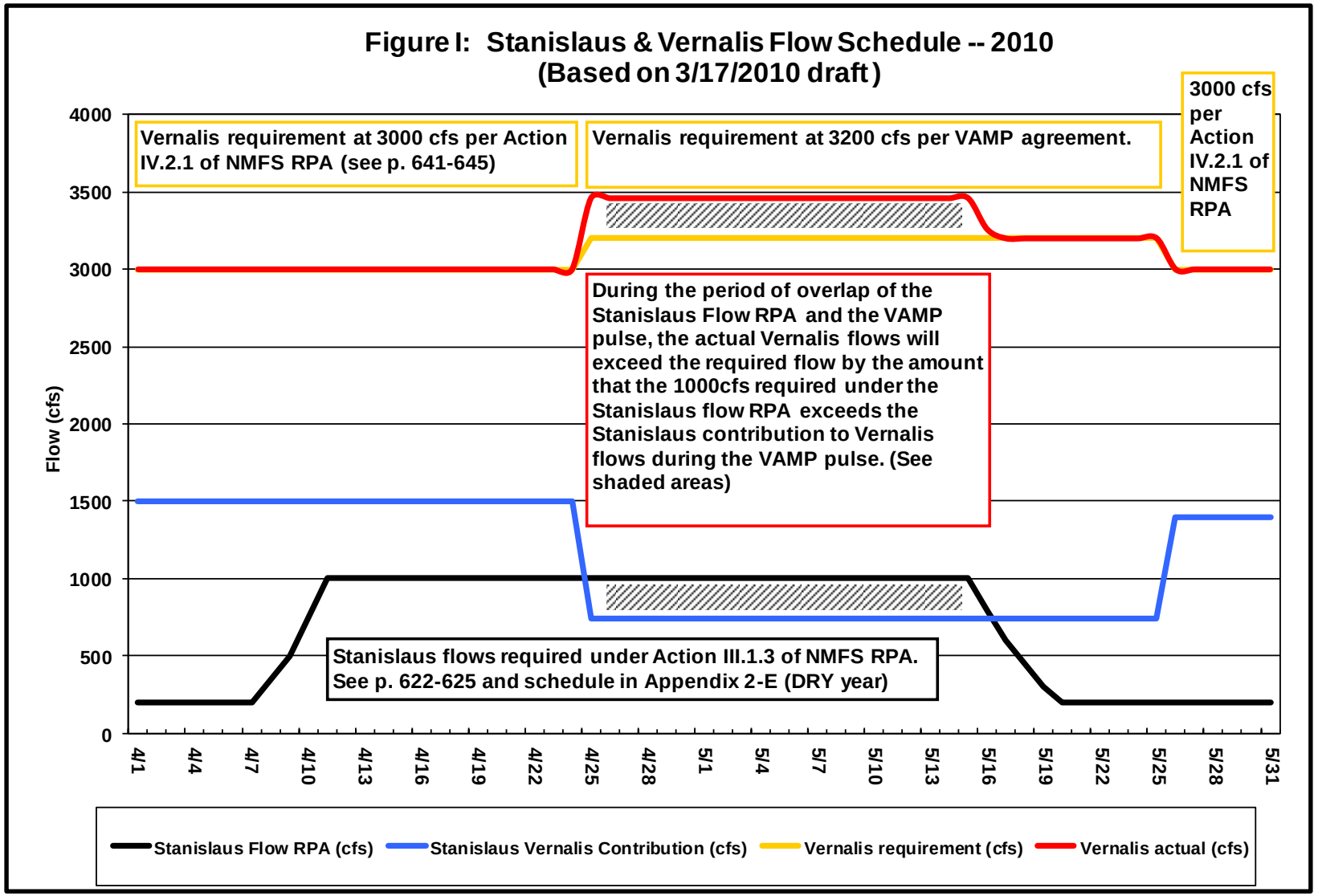
Figure I: Stanislaus & Vernalis Flow Schedule -- 2010
(Based on 3/17/2010 draft)
Vernalis requirement at 3000 cfs per Action IV.2.1 of NMFS RPA (see p. 641-645)
Vernalis requirement at 3200 cfs per VAMP agreement.
3000 cfs per Action IV.2.1 of NMFS RPA
During the period of overlap of the Stanislaus Flow RPA and the VAMP pulse, the actual Vernalis flows will exceed the required flow by the amount that the 1000cfs required under the Stanislaus flow RPA exceeds the Stanislaus contribution to Vernalis flows during the VAMP pulse. (See shaded areas)
Stanislaus flows required under Action III.1.3 of NMFS RPA. See p. 622-625 and schedule in Appendix 2-E (DRY year)
Flow (cfs)
4000
3500
3000
2500
2000
1500
1000
500
0
4/1
4/4
4/7
4/10
4/13
4/16
4/19
4/22
4/25
4/28
5/1
5/4
5/7
5/10
5/13
5/16
5/19
5/22
5/25
5/28
5/31
Stanislaus Flow RPA (cfs)
Stanislaus Vernalis Contribution (cfs)
Vernalis requirement (cfs)
Vernalis actual (cfs)

Flexibility in the timing of particular pulses in the flow RPA, specifically the winter "storm" pulses, the spring pulse (which partially coincided with the VAMP pulse flow) and the October fall pulse flow

During this first year of RPA implementation, SOG has discussed how best to time and shape the pulse flows called for under Action III.1.3, within the flexibility intended in the NMFS BiOp. For example, the "storm" pulse in January was timed to coincide with a natural precipitation event and the February pulse was also reshaped slightly (to a pulse with a higher peak and longer tail, but the same volume) to better mimic a natural flow pulse. SOG expects to continue discussion on how to adaptively implement the pulse components of Action III.1.3 to maximize the intended benefits.

Handling temperature exceedances with the temperature exception procedure

As described in Chapter 3, the way in which SOG has handled temperature exceptions has evolved during the first year of RPA implementation, particularly in terms of what types of information and analysis is provided for discussion to the group. SOG will continue to refine this adaptive management process in the 2011 water year. Some of the issues and challenges the group expects to consider include: using climate forecast information to pre-schedule temperature management releases 3-4 days in advance, and providing springtime seasonal temperature management when release temperatures from the New Melones outlet may not be much cooler than the temperature target downstream at Knights Ferry.

Initiation date of fall temperature criterion

In September 2010, SOG discussed some possible guidelines to consider when implementing the fall temperature criterion (i.e. the drop from 65 degrees to 56 degrees at Orange Blossom Bridge, p. 621 of the NMFS BiOp).

As noted in the Opinion as a footnote to the table on p. 621, the fall temperature criterion "shall apply as of October 1 or as of initiation date of fall pulse flow as agreed to by NMFS." The 56 degree criterion is intended to benefit adult steelhead migrating into the Stanislaus. While NMFS expects most migrants to enter the Stanislaus during or after the fall pulse flow (and generally recommends that the 56 degree temperature criterion be applied at the initiation of the pulse flow), it may be appropriate to initiate the fall temperature criterion prior to the fall pulse flow if temperature conditions are poor and there is evidence to suggest that steelhead are already moving into the system.

The current proposal (still being reviewed by SOG) recommends the following:

> "SOG advises that the fall temperature criterion of 56 degrees F at Orange Blossom Bridge (a component of Action III.1.2) be applied as of the initiation date of the fall pulse flow on the Stanislaus (a component of Action III.1.3), but that an earlier initiation date be considered if either of the following is true:
>
> A. The seven day average of the daily maximum temperature at Orange Blossom Bridge exceeds 60 degrees F (indicating temperatures higher than optimal for early adult migrants)
>
> B. The year-to-date total for cumulative net upstream fall run Chinook passage at the Stanislaus Weir (as reported in the third week of September) exceeds 10% of the prior year's total (indicating that fall run Chinook are exhibiting an earlier-than-usual migration pattern which may indicate that steelhead are also migrating earlier than usual)

As of 9/20, the weir count was 43, 3.4% of 2009's total passage of 1270 fall-run Chinook. Since 9/8, the daily max at OBB has exceeded 60 just once (on 9/18). The 7DADM has been below 60 since 9/11. While there was no formal advice from SOG on the initiation date this year, on 9/30/2010 NMFS advised that, for 2010, the fall temperature criterion of 56 degrees Fahrenheit at Orange Blossom Bridge shall apply as of the initiation date of the fall pulse flow, which is October 15, 2010.

5.3 Successes and Requests for Feedback

SOG provided a monthly forum for the participating agencies to discuss and provide advice on implementation of the Stanislaus actions in the NMFS BiOp. In addition to providing an opportunity to review fish monitoring data and operations data, and to discuss upcoming operations and expected flows and temperature outlooks, the participation of many SOG members in other technical teams related to implementation of the NMFS and FWS BiOps allowed for efficient communication, when appropriate, with other technical teams (e.g., during implementation of the VAMP study when Stanislaus operations and Delta operations were necessarily linked).

The SOG group was also successful in clarifying some implementation guidelines that will be carried forward in future years, and is still working on guidelines relating to, e.g., the temperature exception procedure.

SOG is particularly interested in feedback from the panel on the following questions:

- Can you suggest any studies or monitoring data that would improve our ability to adaptively manage within the flexibility of the RPA actions or improve our ability to assess the effectiveness of our implementation of the RPA actions?

- Can you offer any suggestions about how to manage Stanislaus and other San Joaquin River tributary flows (within the constraints of the RPA and any new VAMP agreement) during the April-May period to maximize the benefits of all flows used to meet the requirements of Action III.1.3, IV.2.1, and VAMP[12]?

- What advice can you provide regarding the implementation (in timing or shaping) of particular pulses in the flow RPA, specifically the winter "storm" pulses, the spring pulse (which partially coincided with the VAMP pulse flow) and the October fall pulse flow?

- What suggestions for temperature management can you offer SOG for the 2011 water year? For example, what sorts of short and long-term analysis would be most appropriate to evaluate temperature management throughout the year?, Are there particular data gaps (e.g., outlet temperatures at New Melones and Tulloch and reservoir temperatures at Goodwin) that you believe would substantively improve the effectiveness of our implementation of Action III.1.2, including the exception procedure?

[12] A VAMP study is expected to occur in 2011 but may not continue past 2011; IV.2.1, the Vernalis flow action, enters Phase II implementation in 2012.

APPENDIX A

Meeting Notes and Handouts – SOG Water Year 2010

Electronic versions of these materials can be found at http://swr.nmfs.noaa.gov/ocap/sog.htm

Date	Meeting Notes and Handout Descriptions	Authored
01/20/10	Meeting Notes – 1/20/10	SOG
	Agenda	Reclamation
	Sign-In Sheet	SOG
	Draft Stanislaus Operations Group Charter – December 17, 2009 version	Reclamation
	Draft Memo of Agreement - December 17, 2009 version	Reclamation
	Operations and Temperature Summary for New Melones and Lower Stanislaus River – Prepared January 20, 2010	Reclamation
	Summary of how water year types are defined and updated in Reclamation's IPO and NMFS BO – Prepared by NMFS January 20, 2010	NMFS
	Transmittal of New Melones Interim Plan of Operations – May 1, 1997	Reclamation
02/01/10 (Telecon)	Meeting Notes – 2/01/10	SOG
	Goodwin Release and Orange Blossom Response – Flow (cfs) Through Time	Reclamation
02/17/10	Meeting Notes – 2/17/10	SOG
	Agenda	Reclamation
	Sign-In Sheet	SOG
	New Melones – Stanislaus River Basin Storage USACE	Reclamation
	Goodwin Dam (GDW) Discharge	Reclamation
	Orange Blossom Bridge Temperatures	Reclamation
	New Melones Lake Daily Operations, Run date: February 17, 2010	Reclamation
	Tulloch Reservoir Daily Operations, Run date: February 17, 2010	Reclamation
	Goodwin Reservoir Daily Operations, Run date: February 17, 2010	Reclamation
03/17/10	Meeting Notes – 3/17/10	SOG
	Agenda	Reclamation
	Sign-in Sheet	SOG
	New Melones – Stanislaus River Basin Storage USACE	Reclamation
	Goodwin Dam (GDW) Discharge	Reclamation
	Orange Blossom Bridge Temperatures	Reclamation
	Estimated Knights Ferry Temperatures	Reclamation
	New Melones Lake Daily Operations, Run date: March 17, 2010	Reclamation
	Tulloch Reservoir Daily Operations, Run date: March 17, 2010	Reclamation
	Goodwin Reservoir Daily Operations, Run date: March 17, 2010	Reclamation
	Draft VAMP Flow Estimates	Reclamation
	Summary of Water Year Types NMFS OCAP BO	NMFS?
	Escapement Summary	DFG

04/28/10	Meeting Notes – 4/28/10	SOG
	Agenda	Reclamation
	Sign-In Sheet	SOG
	NMFS OCAP Biological Opinion: Reasonable and Prudent Alternatives Ref.	Reclamation
	Graph; Chinook Salmon Count	Reclamation
	New Melones Lake Daily Operations, Run Date: April 28, 2010	Reclamation
	Tulloch Reservoir Daily Operations, Run date: April 28, 2010	Reclamation
	Goodwin Reservoir Daily Operations, Run date: April 28, 2010	Reclamation
	New Melones - Stanislaus River Basin USACE	Reclamation
	Goodwin Dam Discharge; 3/24/2010 – 4/28/2010	Reclamation
	Reservoir Storage; End of Month	Reclamation
	Proposed Goodwin Releases for May 2010	Reclamation
	Orange Blossom Bridge Temperatures through April 28, 2010	Reclamation
	Estimated Knights Ferry Temperatures through April 28, 2010	Reclamation
	Preliminary – Stanislaus River April 50% Exceedence Outlook	Reclamation
	Preliminary – Stanislaus River April 90% Exceedence Outlook	Reclamation
	January Temp Relationship between Orange Blossom and Knights Ferry	Reclamation
	February Temp Relationship between Orange Blossom and Knights Ferry	Reclamation
	March Temp Relationship between Orange Blossom and Knights Ferry	Reclamation
	April Temp Relationship between Orange Blossom and Knights Ferry	Reclamation
	May Temp Relationship between Orange Blossom and Knights Ferry	Reclamation
	Evaluation of Historical New Melones Water Supply and Runoff Forecasts	Reclamation
	Historical Water Year Types applied to IPO and NMFS methods	NMFS
05/19/10	Meeting Notes – 5/19/10	SOG
	Agenda	Reclamation
	Sign-in Sheet	SOG
	NMFS OCAP Biological Opinion: Reasonable and Prudent Alternatives Ref.	Reclamation
	Spreadsheet; Chinook Salmon Count	Reclamation
	Graph; Chinook Salmon Count	Reclamation
	Chinook catch at Caswell as of 5-18-2010	Reclamation
	New Melones Lake Daily Operations, Run Date: May 19, 2010	Reclamation
	Tulloch Reservoir Daily Operations, Run date: May 19, 2010	Reclamation
	Goodwin Reservoir Daily Operations, Run date: May 19, 2010	Reclamation
	New Melones - Stanislaus River Basin – USACE: May 19, 2010	Reclamation
	Orange Blossom Bridge Temperatures through May 19, 2010	Reclamation
	Estimated Knights Ferry Temperatures through May 19, 2010	Reclamation

	Preliminary – Simulated Stanislaus River Temperatures May 50% Exceedence Outlook	Reclamation
06/16/10	Meeting Notes – 6/16/10	SOG
	Agenda	Reclamation
	Sign-in Sheet	SOG
	NMFS OCAP Biological Opinion: Reasonable and Prudent Alternatives Ref.	Reclamation
	Chinook salmon possible numbers through June 01, 2014	Reclamation
	Mossdale Trawl Steelhead Catch; April – June 2010 New Melones Lake Daily Operations, Run Date: June 16, 2010	Reclamation
	Tulloch Reservoir Daily Operations, Run date: June 16, 2010	Reclamation
	Goodwin Reservoir Daily Operations, Run date: June 16, 2010	Reclamation
	New Melones - Stanislaus River Basin USACE	Reclamation
	Orange Blossom Bridge Temperature through June, 2010	Reclamation
	New Melones Temperature Profile June, 2010	Reclamation
	Goodwin Dam Releases through June 11, 2010	Reclamation
	Draft – Stanislaus River Gravel Augmentation Plan	Reclamation
07/22/10(Telecon)	Meeting Notes – 7/22/10	SOG
	Agenda	Reclamation
08/18/10	Meeting Notes – 8/18/10	SOG
	Agenda	Reclamation
	New Melones Lake Daily Operations, Run Date: August 18, 2010	Reclamation
	Tulloch Reservoir Daily Operations, Run date: August 18, 2010	Reclamation
	Goodwin Reservoir Daily Operations, Run date: August 18, 2010	Reclamation
	New Melones - Stanislaus River Basin USACE	Reclamation
	Goodwin Dam Releases through August 18, 2010	Reclamation
	Orange Blossom Bridge Temperatures through August, 2010	Reclamation
	New Melones and Tulloch Lake Temperature Profiles August, 2010	Reclamation
	Preliminary – Simulated Stanislaus River Temperatures August 50% Exceedence Outlook	Reclamation
09/15/10	Meeting Notes – 9/15/10	Reclamation
	Sign-in Sheet	SOG
	Agenda	Reclamation
	New Melones Lake Daily Operations, Run Date: September 15, 2010	Reclamation
	Tulloch Reservoir Daily Operations, Run date: September 15, 2010	Reclamation
	Goodwin Reservoir Daily Operations, Run date: September 15, 2010	Reclamation
	New Melones - Stanislaus River Basin USACE	Reclamation
	Goodwin Dam Releases through September 14, 2010	Reclamation
	Stanislaus River OBB Instream Temperatures through September 15, 2010	Reclamation

	Annual Report Workshop Summary	NMFS

Date	Electronic Communication Description	Authored
07/17/09	E-mail - Notification of **RPA Action III.1.2 Exception**	Reclamation
10/28/10	E-mail Notification of **RPA Action III.1.2 Exception**	Reclamation
02/04/10	E-mail NMFS determination re: Stanislaus pulse flow	NMFS
03/05/10	E-mail Notification of **RPA Action III.1.2 Exception**	Reclamation
03/15/10	E-mail – Spreadsheet: Processed field data from CDFG of New Melones and Tulloch Reservoir Temperature Profiles (2010Mar15_NM_TD_Profiles.xls)	Reclamation
03/24/10	E-mail Notification of **RPA Action III.1.2 Exception**	Reclamation
3/29/10	E-mail Final NMFS determination for the Stanislaus and San Joaquin Actions	NMFS
05/4/10	E-mail – Spreadsheet: Processed field data from CDFG of New Melones and Tulloch Reservoir Temperature Profiles (2010Apr26_NM_TD_Profiles.xls)	Reclamation
05/5/10	E-mail Notification of **RPA Action III.1.2 Exception**	Reclamation
06/11/10	E-mail – Spreadsheet: Processed field data from CDFG of New Melones and Tulloch Reservoir Temperature Profiles (2010May25_NM_TD_Profiles.xls)	Reclamation
06/22/10	E-mail – Spreadsheet: Processed field data from CDFG of New Melones and Tulloch Reservoir Temperature Profiles (2010Jun08_NM_TD_Profiles.xls)	Reclamation
07/22/10	E-mail – Spreadsheet: Processed field data from CDFG of New Melones and Tulloch Reservoir Temperature Profiles (2010Jul14_NM_TD_Profiles.xls)	Reclamation
07/26/10	E-mail – Simulated Stanislaus River Temperature Outlook (StanR_Max6hrWT_2010_Jul.pdf	Reclamation
08/18/10	E-mail – Spreadsheet: Processed field data from CDFG of New Melones and Tulloch Reservoir Temperature Profiles (2010Aug10_NM_TD_Profiles.xls)	Reclamation

08/18/10	E-mail Reclamation's proposal to calculate the New Melones Water Supply Parameter.	Reclamation
09/23/10	E-mail – Spreadsheet: Processed field data from CDFG of New Melones and Tulloch Reservoir Temperature Profiles (2010Sep16_NM_TD_Profiles.xls)	Reclamation

APPENDIX B

From:	Fujitani, Paul E
To:	Oppenheim, Bruce;
cc:	Milligan, Ronald E; Field, Randi C; Oconnor, Deedren L;
Subject:	3 Day Average Maximum Stanislaus River Temperature
Date:	Friday, July 17, 2009 5:21:17 PM

Bruce,

This e-mail serves as formal notification, as required by the 2009 NMFS BiOp, that the Exception criteria under Action III.1.2 (Stanislaus River temperature objective at Orange Blossom Bridge) was triggered on July 16, 2009 based on a three-day average daily maximum temperature. A table of maximum daily temperatures and daily average temperatures at Orange Blossom Bridge is shown below. (As discussed via conference call between Reclamation and NMFS staff on July 13, 2009 requesting direction on BiOp RPA procedural actions.)

Recent hot ambient air conditions have increased stream temperatures on the Stanislaus River significantly this month. In the last week, the seven-day average daily maximum temperatures ranged from 63.9 ºF to 64.5 ºF. The average monthly mean temperature (July 1 – July 15) is 61.4 ºF.

Releases from Goodwin Dam were increased July 15, 2009 from 250 cfs to 350 cfs to moderate maximum temperatures at Orange Blossom Bridge. Temperatures are now trending lower due to the increase in flow, however, it is expected the three-day running average daily maximum temperature criteria may take several days to recover. In the absence of today's (July 17, 2009) maximum temperature observation, Reclamation cautiously does not expect the seven-day average daily maximum temperature to exceed the objective in the short term. We believe the increase in maximum temperatures is a temporary condition and when cooler weather returns, the maximum temperatures are expected to remain below the temperature objective at Orange Blossom Bridge.

Given present operations, and taking into account the distribution of O.mykiss rearing in the Stanislaus during summer (they are concentrated mostly from a couple miles downstream of Knights Ferry (Wilms pond vicinity) up to Goodwin Dam with the highest densities upstream of Knights Ferry) we will be meeting suitable temperatures all summer long for the vast majority of these fish. The extent that this distribution is determined by oversummer water temperature is unknown. Gradients down towards Oakdale are low and substrate is finer. This type of habitat further downstream is not conducive to producing the type of invertebrates juvenile trout generally feed on. Trout densities generally decrease

as you head downstream such that there are areas of lower density where competition between larger resident trout and smaller young of the year steelhead should not be an issue (if they are an issue anywhere in the river). Periods of hot clear weather will naturally increase water temperatures throughout the river and growth may be temporarily reduced for fish in the lower river during these warmer periods. These fish have evolved with this general type of pattern. This year's river temperatures should sustain the present steelhead population based on previous year densities and water temperatures.

Given that the new BiOp was just release in June 2009, Reclamation does not yet have a New Melones Reservoir/Stanislaus River temperature model capable of evaluating the reservoir release and river temperatures for project operations as identified in the RPA. We will work towards development of a tool for this purpose, but one is currently not available. Reclamation is also working to establish the Stanislaus River Operations Group to assist in evaluating temperature and flow objectives on the Stanislaus River but this group has yet to be convened.

Tabulated Temperature Data: Orange Blossom Bridge, Stanislaus River

Date	Daily Maximum Temperature (ºF)	Daily Mean Temperature (ºF)
7/1/2009	64.3	60.7
7/2/2009	64.3	61.5
7/3/2009	64.4	61.4
7/4/2009	64.3	61.5
7/5/2009	64.2	61.3
7/6/2009	63.5	60.7
7/7/2009	63.5	60.5
7/8/2009	64.3	61.2
7/9/2009	64.6	61.7
7/10/2009	64.4	61.7
7/11/2009	62.9	61.5
7/12/2009	63.9	61.2
7/13/2009	64.5	61.6
7/14/2009	65.4	62.4
7/15/2009	65.7	62.9

(Data source: CDEC, 7/15/2009 mean data sanitized)

Thank You,
Paul Fujitani
Central Valley Operations Office

3310 El Camino Ave
Sacramento, CA 95821

pfujitani@usbr.gov
(916) 979-2197

From:	Field, Randi C
To:	"bruce.oppenheim@noaa.gov";
cc:	Fujitani, Paul E; Merriweather, Audrey; Garcia, Donna; Milligan, Ronald E;
Subject:	3 Day Average Maximum Stanislaus River Temperature
Date:	Wednesday, October 28, 2009 9:51:00 AM

Bruce,

This e-mail serves as formal notification, as required by the 2009 NMFS BiOp, that the Exception criteria under Action III.1.2 (Stanislaus River temperature objective at Orange Blossom Bridge) was triggered on 10/23/09 on a three-day average daily maximum temperature (this is assumes that the temperature objective began on 10/15/09 and allows for a seven-day adjustment period). A table of maximum daily temperatures and daily average temperatures at Orange Blossom Bridge is shown below. (As discussed via conference call between Reclamation and NMFS staff on July 13, 2009 requesting direction on BiOp RPA procedural actions.)

Water temperatures on the Stanislaus River continue to be elevated above the temperature target of 56 ºF at Orange Blossom Bridge. In the last five days, the seven-day average daily maximum temperatures ranged from 56.1 ºF to 56.5 ºF. The average monthly mean temperature (October 1 – October 26) is 56.4 ºF.

Releases from Goodwin Dam were increased beginning October 15, 2009 from 200 cfs to a maximum of 1500 cfs on October 21, 2009 as specified in the Stanislaus River Minimum Fish Flow Schedule provided by NMFS. Temperatures are now trending lower as compared to before the increase in release, however, it is still expected the three-day running average daily maximum temperature criteria will not reach the temperature objective until the weather cools. Reclamation expects the seven-day average daily maximum temperature to exceed the objective in the short term despite the increase in Goodwin releases. We believe the elevated maximum temperatures is a temporary condition and when cooler weather sets in, the maximum temperatures are expected to remain below the temperature objective at Orange Blossom Bridge.

Tabulated Temperature Data: Orange Blossom Bridge, Stanislaus River

Date	Daily Maximum Temperature (ºF)	Daily Mean Temperature (ºF)
10/1/2009	57.9	55.8

10/2/2009	58.8	56.5
10/3/2009	58.5	56.8
10/4/2009	57.8	56.6
10/5/2009	57.3	55.8
10/6/2009	57.6	55.9
10/7/2009	58.1	56.4
10/8/2009	58.3	56.8
10/9/2009	58.6	57.1
10/10/2009	58.8	57.2
10/11/2009	58.4	57.2
10/12/2009	57.7	56.9
10/13/2009	57.4	56.7
10/14/2009	59.8	58.2
10/15/2009	61.3	59.6
10/16/2009	59.3	58.3
10/17/2009	58.5	56.9
10/18/2009	57.2	56.1
10/19/2009	55.6	55
10/20/2009	55.9	54.9
10/21/2009	56	55.1
10/22/2009	56.2	55.2
10/23/2009	56.3	55.4
10/24/2009	56.7	55.6
10/25/2009	56.3	55.5
10/26/2009	56.4	55.6

(Data source: CDEC, 10/27/2009)

Thank you,
Randi Field

Randi Field
U.S. Bureau of Reclamation
Central Valley Operations
3310 El Camino Avenue, Suite 300
Sacramento, CA 95821
(916) 979-2066
(E-mail change: rfield@usbr.gov)

From:	Field, Randi C
To:	Rhonda Reed; Barbara Byrne; Garwin.Yip@noaa.gov;
cc:	Fujitani, Paul E; Milligan, Ronald E; Merriweather, Audrey; Vasquez, Elizabeth A;
Subject:	3 Day Average Maximum Stanislaus River Temperature (March 2010)
Date:	Friday, March 05, 2010 3:26:00 PM
Attachments:	KNF_and_OBB_relationship.pdf

Greetings:

This e-mail serves as formal notification, as required by the 2009 NMFS BiOp, that the Exception criteria under Action III.1.2 (Stanislaus River temperature objective at Knights Ferry) was estimated as triggered on 02/18/10, 3/1/10, and 3/2/10 on a three-day average daily maximum temperature. A table of estimated maximum daily temperatures at Knights Ferry is shown below. (As discussed via conference call between Reclamation and NMFS staff on July 13, 2009 requesting direction on BiOp RPA procedural actions.)

Real-time distribution of temperature data at Knights Ferry is not available. Knights Ferry temperatures are estimated based on an Orange Blossom Bridge and Knights Ferry relationship of year 1999 to year 2007 data collected for temperature modeling (see attached relationship).

In the last five days, the estimated seven-day average daily maximum temperatures ranged from 51.6 ^{o}F to 51.9^{o}F.

Releases from Goodwin Dam were increased on 2/7/10 to 1000 cfs to meet SWRCB D1641 Bay-Delta Vernalis flow requirements. Releases have since been reduced in response to hydrologic events, beginning 2/28/10 to 3/7/10, from 1000 cfs to 200 cfs. At the current release rate, it is expected the three-day running average and seven-day average daily maximum temperature criteria may continue to exceed at Knights Ferry.

Reclamation is actively coordinating data collection efforts to receive reservoir temperature profile information. Although temperature profiles are not yet accessible to Reclamation, it is still early spring and the reservoirs are assumed to be generally destratified. Releases from the reservoirs are expected to be the coldest obtainable. It has also been observed that instream temperatures can rise following storm events due to accretions and mixing of the reservoirs or as a response to warmer weather. Currently, Reclamation has limited flexibility to control downstream temperature. We experienced marginal temperature benefit with increased flow rates from Goodwin Dam (flows of 1000 cfs from Goodwin

Dam did not offer an estimated 3-day average daily maximum temperature protection below 52 ºF). Based on Reclamation's modeling of the February 1, 2010 90% exceedence forecast, low storage conditions at New Melones appear to be a concern for the fall months. Reclamation is taking conservative actions to reduce winter and early spring reservoir releases, when possible, to build storage and develop a cold water pool to meet summer and fall BiOp RPA temperature criteria.

Tabulated Data: Knights Ferry, Stanislaus River

	Estimated Daily Maximum Temperature (ºF)	Goodwin Releases (cfs)
2/1/2010	51	326
2/2/2010	50.9	610
2/3/2010	51.3	611
2/4/2010	50.9	601
2/5/2010	51.4	622
2/6/2010	50.9	438
2/7/2010	51.1	726
2/8/2010	51	1004
2/9/2010	51	1007
2/10/2010	51.1	1010
2/11/2010	51	1000
2/12/2010	51.5	1012
2/13/2010	51.6	1008
2/14/2010	51.7	1007
2/15/2010	51.7	1008
2/16/2010	51.9	1001
2/17/2010	52.1	1007
2/18/2010	51.9	1006
2/19/2010	51.5	1004
2/20/2010	51.3	1003
2/21/2010	51	1008
2/22/2010	51.6	1006
2/23/2010	50.9	1009
2/24/2010	51.2	1005
2/25/2010	52	1001
2/26/2010	51.3	1005
2/27/2010	52	1003
2/28/2010	52.1	938

3/1/2010	52.6	838
3/2/2010	51.8	742
3/3/2010	51.4	587
3/4/2010	52.1	505

(Data Source: CDEC 3/05/2010 data and Knights Ferry relationship attached)

Thank you,
Randi Field

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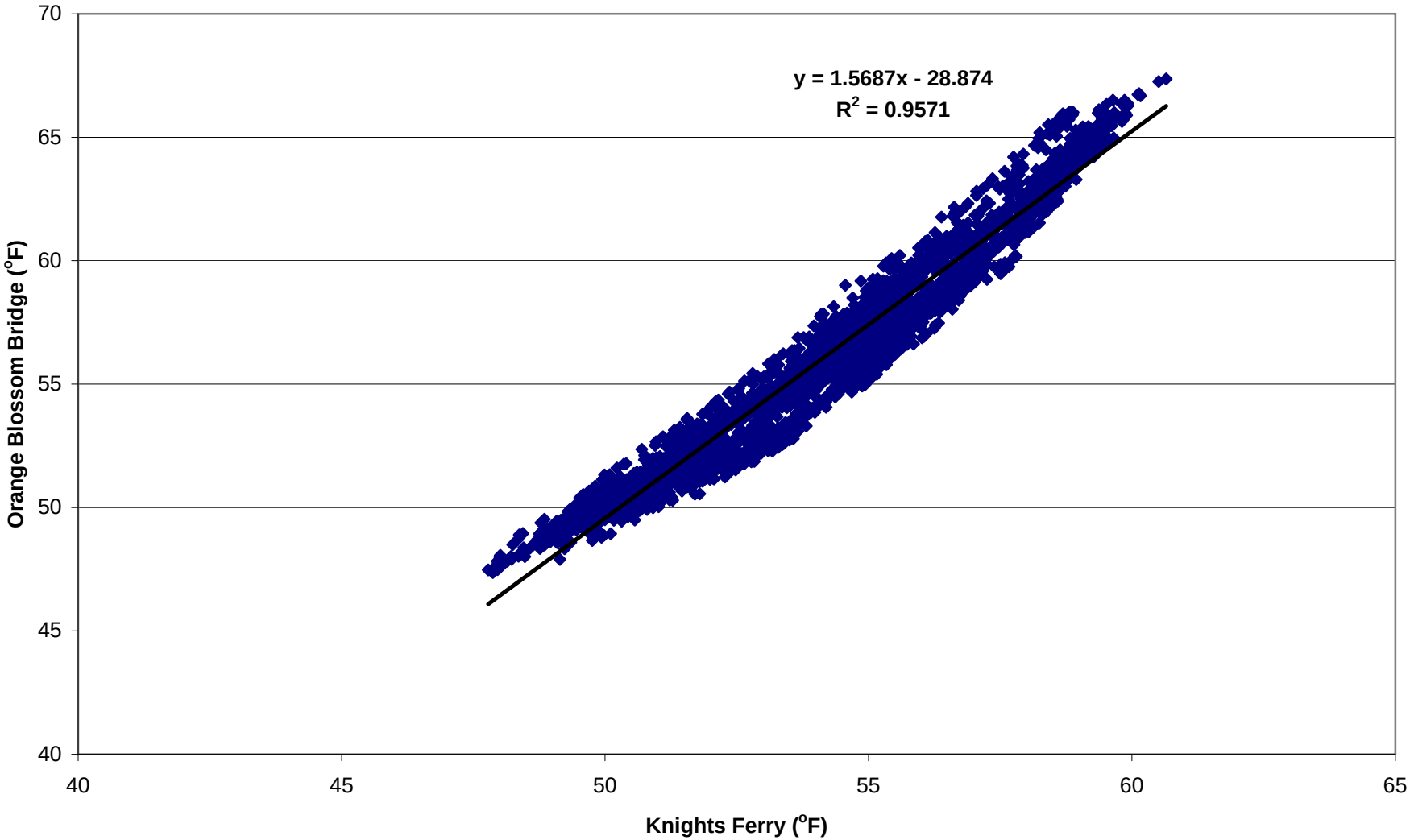
Knights Ferry and Orange Blossom Bridge Temperature Relationship
Based on HWMS Temperature Calib1 - 6hr Mean (1200 to 1800 hrs only)
y = 1.5687x - 28.874
R2 = 0.9571
Orange Blossom Bridge (oF)
Knights Ferry (oF)
70
65
60
55
50
45
40
40
45
50
55
60
65

Barbara Byrne

From: Field, Randi C <RField@usbr.gov>
Sent: Wednesday, March 24, 2010 2:22 PM
To: Barbara Byrne; Fujitani, Paul E; Garwin.Yip@noaa.gov; Merriweather, Audrey; Milligan, Ronald E; Rhonda Reed; Vasquez, Elizabeth A
Subject: 3 Day Average Maximum Stanislaus River Temperature (March 2010) 2

Greetings:

This e-mail serves as formal notification, as required by the 2009 NMFS BiOp, that the Exception criteria under Action III.1.2 (Stanislaus River temperature objective at Orange Blossom Bridge) was triggered on 03/16/10 on a three-day average daily maximum temperature, and on 3/18/10 on the seven-day average daily maximum temperature. Immediate verbal notification was provided during the Stanislaus Operations Group (SOG) meeting on 3/17/10. It was advised by the SOG that the target temperature (between Jan 1 and May 31) for Orange Blossom Bridge be the more conservative of the two targets listed, 55 ^{o}F, rather than 57 ^{o}F (NMFS BiOp, p. 621). A table of maximum daily temperatures at Orange Blossom Bridge is provided below in Table 1. (As discussed via conference call between Reclamation and NMFS staff on July 13, 2009 requesting direction on BiOp RPA procedural actions.)

In the last seven days, the Orange Blossom Bridge seven-day average daily maximum temperatures ranged from 54.9 ^{o}F to 57.7^{o}F.

Releases from Goodwin have been held constant at 200 cfs from 3/7/10 to the present day. At the current release rate, it is expected the three-day running average and seven-day average daily maximum temperature criteria may continue to exceed at Orange Blossom Bridge.

Relevant information is reviewed again from the 3/5/10 notification of Knights Ferry temperatures: Reclamation is actively coordinating data collection efforts to receive reservoir temperature profile information. Although temperature profiles are not yet accessible to Reclamation, it is still early spring and the reservoirs are assumed to be generally destratified. Releases from the reservoirs are expected to be the coldest obtainable. It has also been observed that instream temperatures can rise following storm events due to accretions and mixing of the reservoirs or as a response to warmer weather. Currently, Reclamation has limited flexibility to control downstream temperature. We experienced marginal temperature benefit with increased flow rates from Goodwin Dam (a new statistical relationship was formed between Knights Ferry and Orange Blossom Bridge and flows of 800 cfs from Goodwin Dam did not offer an estimated 3-day average daily maximum temperature protection below 52 ^{o}F at Knights Ferry). Based on Reclamation's modeling of the March 2010 90% exceedence forecast, low storage conditions at New Melones appear to be a concern for the fall months. Reclamation is taking conservative actions to reduce winter and early spring reservoir releases, when possible, to build storage and develop a cold water pool to help meet summer and fall BiOp RPA temperature criteria.

As experienced in mid-February and early March, higher flows did not achieve desired temperature protection during periods of warmer weather. Historical March and April temperatures downstream of Goodwin Dam range between 48.5 ^{o}F and 55.2 ^{o}F, average temperatures were 51.5 ^{o}F (Figure 1). Based on recent experience and observed historical data, Reclamation would not expect the desired temperature criteria to be consistently met under higher flows and it is unlikely to consistently meet the temperature requirement at both Knights Ferry and Orange Blossom Bridge for the remainder of March and April.

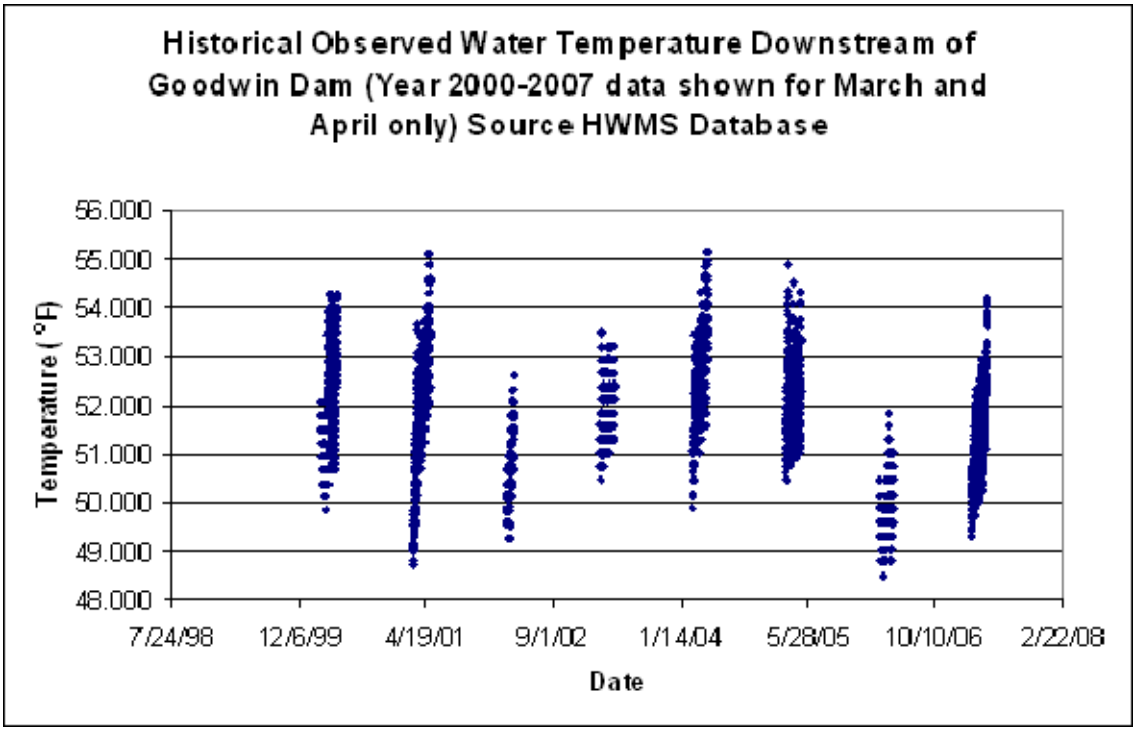

Figure 1 – Historical water temperature downstream of Goodwin Dam.

Reclamation cannot determine, with certainty, the magnitude or duration of actual temperature exceedence because of the limitations of meteorological forecasts (accuracy of meteorological forecasts degrade after approximately 5 days or less). However, estimates of future temperature performance can be inferred from model simulations. A representative temperature simulation was evaluated at Knights Ferry and Orange Blossom Bridge using the HMWS temperature tool (Figure 2). The results indicate difficulty consistently meeting both the Knights Ferry and Orange Blossom temperature targets through the end of March and April. This information should be used cautiously, it is not the past or a forecast of future meteorological conditions and reservoir temperature profile data are not available; the inputs, assumptions, and model have limitations which affect the accuracy of the output.

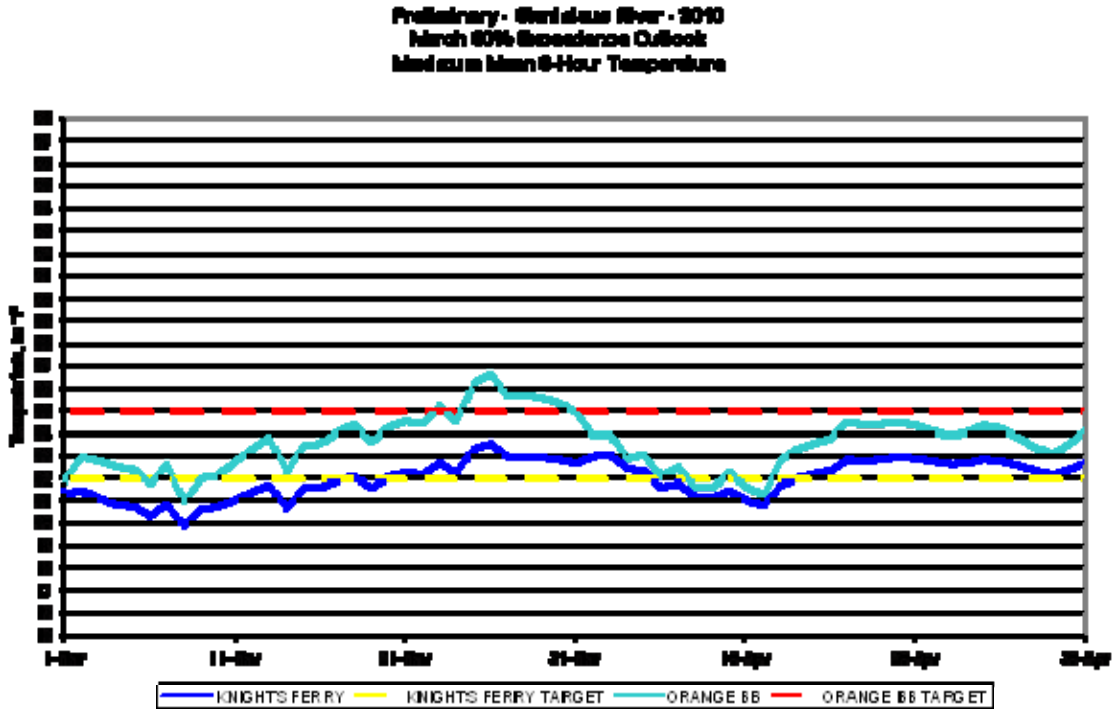

Figure 2. Preliminary HWSM temperature model results for a representative March and April at Knights Ferry and Orange Blossom Bridge.

Table 1. Recent Stanislaus River data.

Date	Orange Blossom Daily Maximum Temp. (°F)	Est. Knights Ferry Daily Maximum Temp. (°F)	Goodwin Release (cfs)	Total Canal Diversions (cfs)	Tulloch Release (cfs)	New Melones Storage (AF)	Comments
15-Feb-10	52.3	51.6	1008	36	966	1,226,808	
16-Feb-10	52.6	51.7	1001	35	964	1,225,908	
17-Feb-10	52.8	51.9	1007	34	978	1,225,171	Goodwin Releases are over 1000 cfs and the max. temp. at Knights Ferry is 0.1 degree from 52 °F
18-Feb-10	52.6	51.7	1006	34	950	1,225,171	
19-Feb-10	51.9	51.3	1004	35	981	1,224,188	
20-Feb-10	51.6	51.2	1003	36	993	1,224,025	
21-Feb-10	51.2	50.9	1008	36	997	1,224,188	
22-Feb-10	52.1	51.5	1006	37	996	1,222,551	
23-Feb-10	50.9	50.7	1009	37	994	1,222,714	
24-Feb-10	51.5	51.1	1005	17	962	1,223,779	
25-Feb-10	52.7	51.8	1001	0	945	1,224,598	
26-Feb-10	51.6	51.2	1005	0	947	1,225,416	
27-Feb-10	52.7	51.8	1003	0	940	1,231,738	
28-Feb-10	52.9	51.9	938	0	875	1,234,122	
1-Mar-10	53.6	**52.3**	838	0	784	1,235,684	Goodwin Release is over 800 cfs and the max. temp. at Knights Ferry is greater than 52 °F.
2-Mar-10	52.4	51.6	742	2	678	1,236,756	
3-Mar-10	51.7	51.2	587	11	528	1,240,719	
4-Mar-10	52.8	51.9	505	3	457	1,244,519	
5-Mar-10	52.9	51.9	365	0	328	1,247,172	
6-Mar-10	53.8	**52.5**	304	0	286	1,249,328	
7-Mar-10	**55.2**	**53.3**	238	0	219	1,251,152	
8-Mar-10	53.9	**52.5**	201	3	189	1,252,811	
9-Mar-10	53.3	**52.2**	203	36	243	1,254,476	
10-Mar-10	53.4	**52.2**	204	42	250	1,256,391	
11-Mar-10	53.9	**52.5**	204	41	251	1,258,223	
12-Mar-10	53.1	**52.0**	216	469	679	1,259,805	Canal diversions have no apparent effect on temperatures.
13-Mar-10	53.8	**52.5**	203	705	906	1,261,639	
14-Mar-10	54.3	**52.7**	203	661	865	1,262,475	
15-Mar-10	**55.3**	**53.3**	203	659	865	1,263,228	
16-Mar-10	**56.5**	**54.0**	202	658	868	1,263,813	
17-Mar-10	**57.7**	**54.8**	203	653	863	1,263,980	
18-Mar-10	**57.9**	**54.9**	203	660	869	1,264,816	
19-Mar-10	**57.6**	**54.7**	204	659	872	1,264,983	
20-Mar-10	**57.5**	**54.6**	206	659	872	1,266,154	
21-Mar-10	**57.4**	**54.6**	204	673	873	1,267,073	
22-Mar-10	**57.9**	**54.9**	211	734	941	1,267,491	

Data Source: 3/23/10 CDEC and Reclamation

Thank you,
Randi Field

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Barbara Byrne

From: Field, Randi C <RField@usbr.gov>
Sent: Wednesday, May 05, 2010 2:19 PM
To: Barbara Byrne; Barnett-Johnson, Rachel; Fujitani, Paul E; Garwin.Yip@noaa.gov; Hannon, John M; Kiteck, Elizabeth G; Merriweather, Audrey; Rhonda Reed; Vasquez, Elizabeth A
Subject: 3 Day Ave Max Stan R Temp

Greetings:

This e-mail serves as formal notification, as required by the 2009 NMFS BiOp, that the Exception criteria under Action III.1.2 (Stanislaus River temperature objective at Orange Blossom Bridge) was triggered on 04/29/10 on a seven-day average daily maximum temperature. Verbal notification of the three-day notice was provided during the Stanislaus Operations Group (SOG) meeting on 4/28/10. It was advised by the SOG that the target temperature (between Jan 1 and May 31) for Orange Blossom Bridge be the more conservative of the two targets listed, 55 ^{o}F, rather than 57 ^{o}F (NMFS BiOp, p. 621). A table of maximum daily temperatures at Orange Blossom Bridge is provided below in Table 1. (As discussed via conference call between Reclamation and NMFS staff on July 13, 2009 requesting direction on BiOp RPA procedural actions.)

In the last seven days, the Orange Blossom Bridge seven-day average daily maximum temperatures ranged from 54.7 ^{o}F to 55.1^{o}F.

Releases from Goodwin have been held constant at 1000 cfs from 4/9/10 to the present day. At the current release rate, it is expected the three-day running average and seven-day average daily maximum temperature criteria may continue to exceed at Orange Blossom Bridge.

Reclamation is coordinating data collection efforts to receive regular reservoir temperature profile information from the California Department of Fish and Game. Reservoir temperature profiles have been collected for March and April. Releases from New Melones Reservoir are approximately the coldest obtainable. Currently, Reclamation has limited flexibility to control downstream temperature. Flow rates of 1,000 cfs from Goodwin Dam are not offering the 7-day average daily maximum temperature protection below 52 ^{o}F at Knights Ferry and below 55 ^{o}F at Orange Blossom Bridge. Based on Reclamation's modeling of the April 2010 50% exceedence forecast, lower storage conditions at New Melones still appear to be a concern for the fall months. Reclamation is taking conservative actions to build storage and develop a cold water pool to help meet summer and fall BiOp RPA temperature criteria.

Historical May temperatures just downstream of Goodwin Dam range between 49.6 ^{o}F and 56.8 ^{o}F, average temperature was 52.8 ^{o}F (Figure 1).

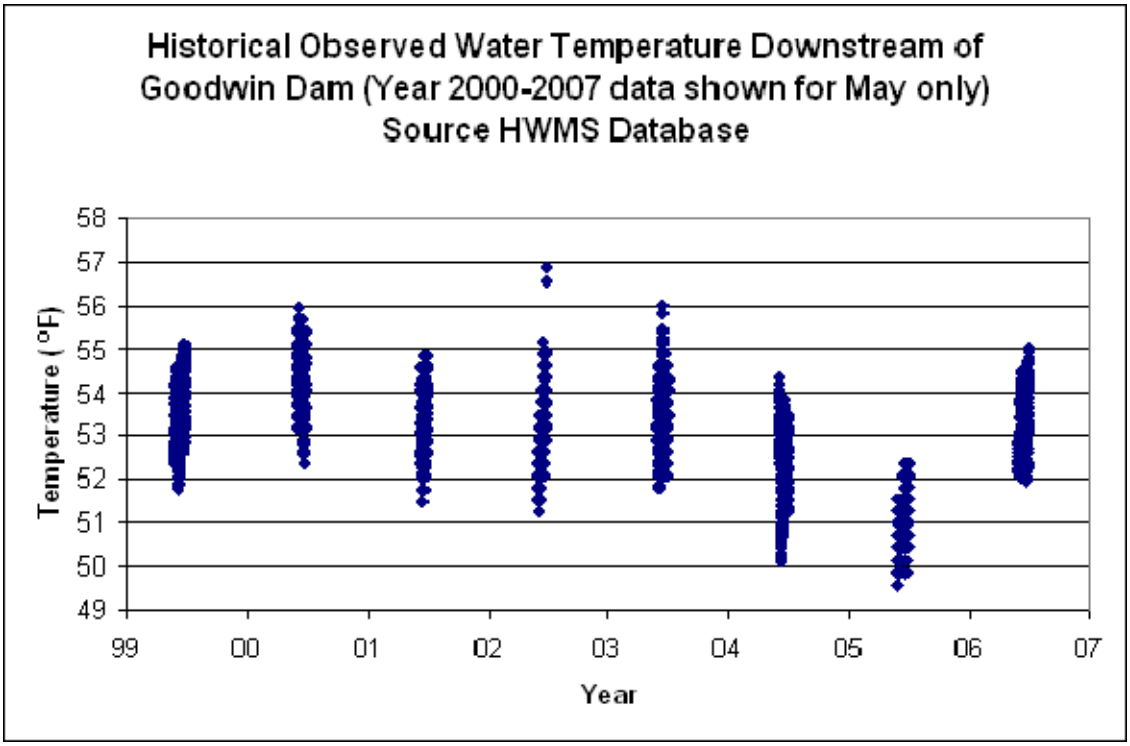

Figure 1 – Historical water temperature ranges downstream of Goodwin Dam for the month of May.

Reclamation cannot determine, with certainty, the magnitude or duration of actual temperature exceedence because of the limitations of meteorological forecasts (accuracy of meteorological forecasts degrade after approximately 5 days or less). However, estimates of future temperature performance can be inferred from model simulations. A representative temperature simulation was evaluated at Knights Ferry and Orange Blossom Bridge using the HMWS temperature tool (Figure 2). The results indicate difficulty consistently meeting both the Knights Ferry and Orange Blossom temperature targets through the end of May. This information should be used cautiously, it is not the past or a forecast of future meteorological conditions; the inputs, assumptions, and model have limitations which affect the accuracy of the output. Reservoir temperature profiles and storage conditions from the end of April were used to generate these results.

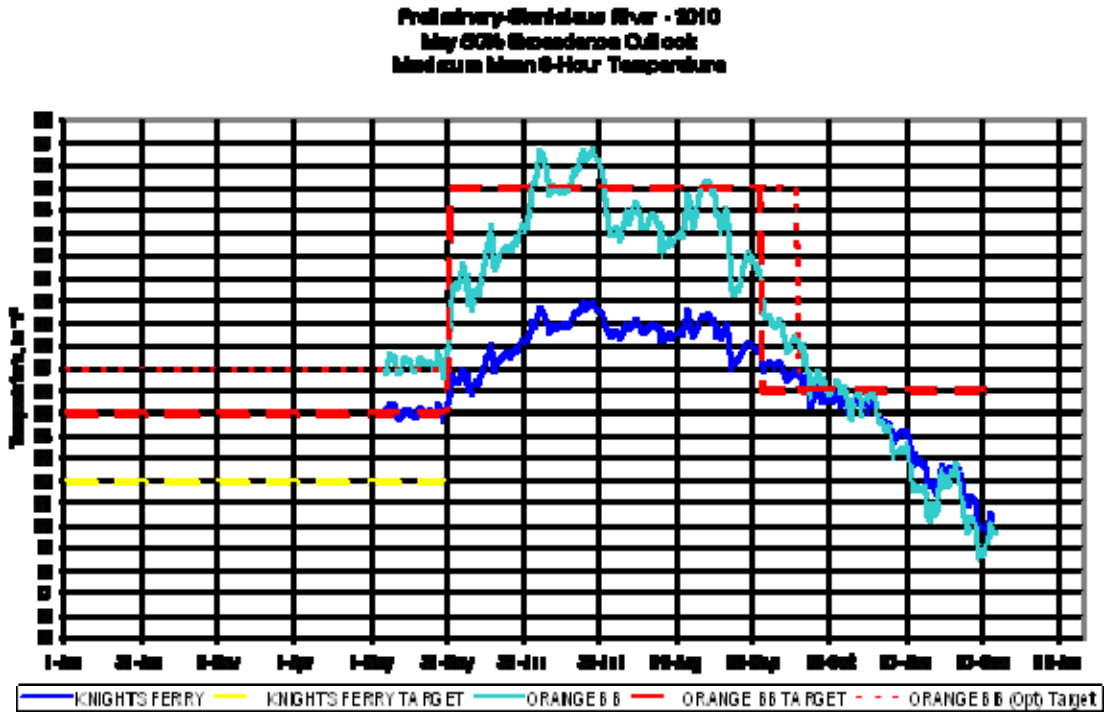

Figure 2. Preliminary HWSM temperature model results for a representative May through December at Knights Ferry and Orange Blossom Bridge.

Table 1. Recent Stanislaus River data (the Knights Ferry estimate uses the monthly statistical relationship distributed on 4/28/10 for data that begins on 5/1/10).

Date	Orange Blossom Daily Maximum Temp. (°F)	Est. Knights Ferry Daily Maximum Temp. (°F)	Goodwin Release (cfs)	Total Canal Diversions (cfs)	Tulloch Release (cfs)	New Melones Storage (AF)	Comments
23-Mar-10	57.7	54.8	199	726	920	1,267,073	
24-Mar-10	57.9	54.9	205	795	997	1,266,321	
25-Mar-10	57.1	54.4	207	849	1,055	1,266,739	
26-Mar-10	57.2	54.5	204	900	1,105	1,266,405	
27-Mar-10	57.2	54.5	206	914	1,129	1,267,157	
28-Mar-10	57.8	54.8	206	804	1,014	1,267,575	
29-Mar-10	57.9	54.9	203	771	979	1,266,321	
30-Mar-10	57.6	54.7	203	873	1,074	1,266,739	
31-Mar-10	56.2	53.9	256	1114	1,360	1,267,408	
1-Apr-10	55.3	53.3	1274	1227	2,563	1,265,234	Goodwin releases increased (NMFS BO RPA IV.2.1)
2-Apr-10	52.4	51.6	1354	1224	2,669	1,262,308	
3-Apr-10	52.9	51.9	1355	1227	2,701	1,260,387	
4-Apr-10	51.6	51.2	1359	1216	2,696	1,258,389	
5-Apr-10	53.4	52.2	1365	1092	2,572	1,256,474	
6-Apr-10	53.7	52.4	1353	954	2,398	1,253,560	
7-Apr-10	53.9	52.5	1356	859	2,302	1,250,405	
8-Apr-10	54.1	52.6	1358	866	2,311	1,248,250	
9-Apr-10	53.9	52.5	1170	972	2,096	1,247,338	
10-Apr-10	52.6	51.7	1005	1111	2,013	1,246,260	Goodwin releases decreased (NMFS BO RPA III.1.3)
11-Apr-10	51.9	51.3	1006	871	1,797	1,246,260	
12-Apr-10	52.7	51.8	1014	687	1,640	1,247,089	
13-Apr-10	54.2	52.7	1006	439	1,365	1,247,835	
14-Apr-10	54.5	52.9	999	381	1,301	1,250,074	
15-Apr-10	54.5	52.9	1007	380	1,320	1,250,903	
16-Apr-10	55.0	53.2	1022	270	1,246	1,252,644	
17-Apr-10	55.0	53.2	1006	535	1,484	1,253,643	
18-Apr-10	55.5	53.5	1008	537	1,488	1,253,310	
19-Apr-10	54.8	53.0	1007	549	1,504	1,252,811	
20-Apr-10	53.5	52.3	1010	604	1,561	1,254,726	
21-Apr-10	52.0	51.4	1004	607	1,567	1,257,057	
22-Apr-10	53.0	52.0	1000	569	1,528	1,258,639	
23-Apr-10	55.2	53.3	1006	513	1,466	1,262,057	
24-Apr-10	55.9	53.7	1007	468	1,430	1,264,983	
25-Apr-10	56.1	53.8	1008	379	1,329	1,266,405	
26-Apr-10	56.1	53.8	1004	243	1,193	1,265,987	
27-Apr-10	54.4	52.8	1003	259	1,207	1,268,996	
28-Apr-10	53.4	52.2	1003	443	1,381	1,272,773	
29-Apr-10	54.7	53.0	1005	585	1,534	1,274,788	
30-Apr-10	55.1	53.2	1003	678	1,624	1,276,719	
1-May-10	55.7	53.9	1005	804	1,767	1,277,727	

2-May-10	**56.2**	**54.2**	1001	937	1,910	1,277,980
3-May-10	**56.7**	**54.5**	1005	981	1,966	1,278,907

Thank you,
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APPENDIX C

Differences in designating yeartype for implementation of Action III.1.3 of the NMFS BiOp

The Interim Plan of Operations for New Melones Reservoir (IPO) described five water supply categories based on a water supply parameter (sometimes referred to as the "New Melones Index (NMI)") that was the sum of end of February New Melones Reservoir Storage and forecasted inflow to New Melones Reservoir from March through September. While not explicit in the IPO, in practice the water supply parameter was calculated based on the 90% exceedence forecast of inflow. Reclamation operates for the NMFS BiOp RPA Actions and continues to use the "IPO framework" to calculate the water supply parameter and associated water supply categories in the Stanislaus basin.

The NMFS BiOp also uses the IPO water supply parameter to designate yeartype under Action III.1.3 (see NMFS BiOp at p. 624), but does not specify that NMFS intended that the NMI be calculated based on the 50% forecast, nor that (because of the intended switch in forecast used) NMFS described water supply categories, or yeartypes, based on an adjusted set of water supply parameter ranges. At the January 2010 SOG meeting, NMFS provided clarification to SOG as to the intended yeartype designation process; a process consistent with the assumptions used to model this RPA during its development[1].

A final determination of the water year classification calculation method and implementation is currently under review.

[1] Note that because CALSIM II operates with "perfect foresight", there is no forecast component to calculation of the NMI in a CALSIM II model run. The only difference between a CALSIM II model run under the "IPO framework" versus the "RPA framework" is the table used to designate yeartype based on the calculated NMI. In practice, of course, we do not have perfect foresight and the choice of forecast is a factor in designating yeartype.

Table C-1: Comparison of how water year types are defined and updated under Reclamation's "IPO framework" and NMFS' "RPA framework". New Melones Index = NMI = actual end of February storage plus the forecast of March through September inflows to New Melones Reservoir.

Component	Reclamation's "IPO framework"	NMFS' "RPA framework"	Comments
1. Which forecast (50% or 90%) of the through-September inflow is used to calculate the NMI?	90% (not explicit in IPO, but is the current practice, 1997-present)	50% (not explicit in the BO, but is the intended practice of the NMFS RPA)	See evaluation of New Melones storage change using the 50% and the 90% runoff exceedence forecast
2. What is the updating process for the NMI and associated water year type? That is, when is the NMI (and associated year type) first calculated? How often is it adjusted?	The NMI parameter can be calculated when the data becomes available from DWR, typically every month January through May. Monthly updates include the actual inflows from the previous months. Updates may be implemented as soon as they are available. See implementation proposal for specific details.	The NMI will be calculated by the end of the second full week of February; and updated by the second full week of each subsequent month through June. Monthly updates include the actual inflows from the previous months. For each NMI, the schedule of minimum instream flows associated with the resultant yeartype will begin on the first day of the following month. The June NMI will set the schedule to be used through February of the following year.	Both frameworks use the following formula: actual end of Feb storage + actual inflows from March through the most recent month + forecasted inflows to New Melones from the current month through September.
3. How does the NMI map to water supply category/yeartype?	Water supply category/yeartype (NMI, in TAF) Low/Critical (0-1,400) Medium-Low/Dry (1,400-2,000) Medium/Below Normal (2,000-2,500) Medium-High/Above Normal (2,500-3,000) High/Wet (3,000-6,000)	Water yeartype (NMI, in TAF) Very Critical (1000 ≤ NMI ≤ 1399)[2] Critically Dry (1400 ≤ NMI ≤ 1725) Dry (1726 ≤ NMI ≤ 2177) Below Normal (2178 ≤ NMI ≤ 2386) Above Normal (2387 ≤ NMI ≤ 2761) Wet (2762 ≤ NMI)	

[2] The "Very Critical" yeartype was modeled using a flow schedule patterned after those provided in Appendix 2-E; this schedule was provided to SOG in January of 2010 and is included here for informational purposes. However, the flow schedule was not included in Appendix 2-E because it was used more as a modeling tool than as a full characterization of appropriate flows for CV steelhead throughout a Very Critical year. For example, while NMFS did not specify any minimum summer flows in the modeled flow schedule for Very Critical years, NMFS assumes that instream flow would be provided under the Ripon Dissolved Oxygen standard.

Clarified Intent of the NMFS OCAP BO RPA Action III.1.3

As a point of clarification, the definitions of yeartypes given in Appendix 2-E and implementation details of the Appendix 2-E minimum instream flow requirement schedules, as modeled (but see footnote 1) during development of the NMFS BiOp, are provided below:

> **"Wet"** yeartype is when the New Melones Index is greater than 2762 TAF.
> "Above Normal" is when the New Melones Index is greater than or equal to 2387 TAF and less than or equal to 2761 TAF.
> **"Below Normal"** is when the New Melones Index is greater than or equal to 2178 TAF and less than or equal to 2386 TAF.
> **"Dry"** is when the New Melones Index is greater than or equal to 1725 TAF and less than or equal to 2177 TAF.
> **"Critically Dry"** is when the New Melones Index is greater than or equal to 1400 TAF and less than or equal to 1724 TAF.
> **"Very Critical"** is when the New Melones Index is greater than or equal to 1000 TAF and less than or equal to 1399 TAF.
>
> In the unlikely event of the New Melones Index being calculated as being less than 1000 TAF, NMFS assumes that SOG will provide advice to NMFS and WOMT on how to manage flows.

By the end of the second full week of February, the New Melones Index (NMI) will be calculated. In February, the NMI is hereby defined as the sum of projected End-of-February New Melones storage plus the sum of DWR's February 50% exceedance forecast of inflows to New Melones Reservoir for the period Mar 1st through Sep 30th. The daily schedule of minimum instream flow requirements associated with the resultant yeartype (as defined above) will commence on March 1st.

By the end of the second full week of March, the New Melones Index (NMI) will be recalculated. In March, the NMI is hereby defined as the sum of End-of-February New Melones storage plus the sum of DWR's March 50% exceedance forecast of inflows to New Melones Reservoir for the period Mar 1st through Sep 30th. The daily schedule of minimum instream flow requirements associated with the resultant yeartype (as defined above) will commence on April 1st.

By the end of the second full week of April, the New Melones Index (NMI) will be recalculated. In April, the NMI is hereby defined as the sum of End-of-February New Melones storage plus the actual New Melones inflow during March plus the sum of DWR's April 50% exceedance forecast of inflows to New Melones Reservoir for the period Apr 1st through Sep 30th. The daily schedule of minimum instream flow requirements associated with the resultant yeartype (as defined above) will commence on May 1st.

By the end of the second full week of May, the New Melones Index (NMI) will be recalculated. In May, the NMI is hereby defined as the sum of End-of-February New Melones storage plus the actual New Melones inflow during March and April plus the sum of DWR's May 50% exceedance forecast of inflows to New Melones Reservoir for the period May 1st through Sep 30th. The daily schedule of minimum instream flow requirements associated with the resultant yeartype (as defined above) will commence on June 1st.

By the end of the second full week of Jun, the New Melones Index (NMI) will be recalculated. In June, the NMI is hereby defined as the sum of End-of-February New Melones storage plus the actual New Melones inflow during March, April and May plus the sum of DWR's May 50% exceedance forecast of inflows to New Melones Reservoir, incorporating any DWR updates since the official May forecast, for the period Jun 1st through Sep 30th. The daily schedule of minimum instream flow requirements associated with the resultant yeartype (as defined above) will commence on July 1st and continue until March 1st of the following year.

Flow schedule for a "Very Critical" yeartype (for modeling purposes, as described in footnote 2)

Stanislaus River Minimum Fish Flow Schedule
Water Year Type: Very Critical

OCT	CFS	NOV	CFS	DEC	CFS	JAN	CFS	FEB	CFS	MAR	CFS
1	110	1	200	1	200	1	125	1	125	1	125
2	110	2	200	2	200	2	125	2	125	2	125
3	110	3	200	3	200	3	125	3	125	3	125
4	110	4	200	4	200	4	125	4	125	4	125
5	110	5	200	5	200	5	125	5	125	5	125
6	110	6	200	6	200	6	125	6	125	6	125
7	110	7	200	7	200	7	125	7	125	7	125
8	110	8	200	8	200	8	125	8	125	8	125
9	110	9	200	9	200	9	125	9	125	9	125
10	110	10	200	10	200	10	125	10	125	10	125
11	110	11	200	11	200	11	125	11	125	11	125
12	110	12	200	12	200	12	125	12	125	12	125
13	110	13	200	13	200	13	125	13	125	13	125
14	110	14	200	14	200	14	125	14	125	14	125
15	110	15	200	15	200	15	125	15	125	15	125
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26	110	26	200	26	200	26	125	26	125	26	125
27	110	27	200	27	200	27	125	27	125	27	125
28	110	28	200	28	200	28	125	28	125	28	125
29	110	29	200	29	200	29	125			29	125
30	110	30	200	30	200	30	125			30	125
31	110			31	200	31	125			31	125

APR	CFS	MAY	CFS	JUN	CFS	JUL	CFS	AUG	CFS	SEP	CFS
1	250	1	500	1	0	1	0	1	0	1	0
2	250	2	500	2	0	2	0	2	0	2	0
3	250	3	500	3	0	3	0	3	0	3	0
4	250	4	500	4	0	4	0	4	0	4	0
5	250	5	500	5	0	5	0	5	0	5	0
6	250	6	500	6	0	6	0	6	0	6	0
7	250	7	500	7	0	7	0	7	0	7	0
8	250	8	500	8	0	8	0	8	0	8	0
9	250	9	500	9	0	9	0	9	0	9	0
10	250	10	500	10	0	10	0	10	0	10	0
11	250	11	500	11	0	11	0	11	0	11	0
12	250	12	500	12	0	12	0	12	0	12	0
13	250	13	500	13	0	13	0	13	0	13	0
14	250	14	500	14	0	14	0	14	0	14	0
15	500	15	500	15	0	15	0	15	0	15	0
16	500	16	250	16	0	16	0	16	0	16	0
17	500	17	250	17	0	17	0	17	0	17	0
18	500	18	250	18	0	18	0	18	0	18	0
19	500	19	250	19	0	19	0	19	0	19	0
20	500	20	250	20	0	20	0	20	0	20	0
21	500	21	250	21	0	21	0	21	0	21	0
22	500	22	250	22	0	22	0	22	0	22	0
23	500	23	250	23	0	23	0	23	0	23	0
24	500	24	250	24	0	24	0	24	0	24	0
25	500	25	250	25	0	25	0	25	0	25	0
26	500	26	250	26	0	26	0	26	0	26	0
27	500	27	250	27	0	27	0	27	0	27	0
28	500	28	250	28	0	28	0	28	0	28	0
29	500	29	250	29	0	29	0	29	0	29	0
30	500	30	250	30	0	30	0	30	0	30	0
		31	250			31	0	31	0		

Evaluation of Historical New Melones Water Supply and Runoff Forecasts

Purpose: Historical New Melones data is presented to understand the risk associated with using less conservative hydrologic runoff forecasts.

Background: See (3/17/2010) handout from NMFS "Table 1. Summary of how water year types are defined and updated in Reclamation's Interim Plan of Operations and the NMFS OCAP Biological Opinion."

Generalized Observations (from small sample, 8 years, of historical data):

- In this sample, 70% of the water year type designations result in the same minimum flow category, or result in the same release volume downstream regardless of forecast or flow category. The remaining 30% can be classified in two groups, the 90% IPO method which is less conservative on the drier/less storage condition, and the 50% NMFS method which is more liberal on the wetter/more storage condition.

- The proposed NMFS minimum flow categories using the 50% runoff forecast appears to be more protective to storage in the drier/less storage conditions. Estimated downstream loss/storage retention, in this condition, is approximately 40 TAF/yr.

- In years where the is little discrepancy between the actual and designated year type category, the proposed NMFS minimum flow categories using the 50% runoff forecast appears to be more liberal to downstream releases in the wet/more storage conditions. Estimated downstream gain/storage loss, in this condition, is approximately 20 TAF.

- Year 2007 exemplifies the situation where the actual water year type (Critical) is the most inconsistent with the designated category (NMFS Minimum Flow category Above Normal, due to high storage conditions). This particular year (Table 1 highlighted) would have yielded a downstream gain/storage loss of approximately 110 TAF in a Critical water year and at the beginning of a dry period.

Discussion:
Using the 50% runoff exceedence forecast early in the spring, especially in the month of March, poses a risk that forecasted water will not manifest as inflow into the reservoir. In the year 2007 example, the 50% forecasted inflow March-September was 579 TAF (the 90% forecasted inflow March-September was 385 TAF). The actual March-September inflow was 319 TAF.

The 1993 NMFS BO requirement (as applied to the Shasta and Trinity system) states to issue the spring allocation of deliverable water "based on a [sic] estimates of precipitation and runoff at least using conservative as 90 percent probability of exceedance". The

rational for using the more conservative forecast is to “substantially reduce the risk of adverse temperature conditions” later in the season. The same reservoir dynamics and risks are applicable to New Melones Reservoir. It is likely that higher minimum flows in the spring and desired temperature objectives in the late summer/fall cannot both be achieved without a conscious compromise.

Table 1. Historical Water Year Types applied to IPO and NMFS methods

Final SJR Water Year Type	Month	End of February Storage (TAF)	IPO Categories (90%)	NMFS Min Flow Categories (50%)	Est. Absolute Storage Difference (TAF)	Loss/Gain to Storage (TAF)
Dry	Feb-02	1587	**BN**	**BN**	0	
Dry	Mar-02		**BN**	**BN**	0	
Dry	Apr-02		**BN**	**BN**	0	
Dry	May-02		**BN**	**D**	38	Loss
Below Normal	Jan-03		**D**	**BN**	0	
Below Normal	Feb-03	1427	**D**	**D**	0	
Below Normal	Mar-03		**D**	**D**	0	
Below Normal	Apr-03		**D**	**D**	0	
Below Normal	May-03		**BN**	**D**	38	Loss
Dry	Apr-04	1442	**D**	**D**	0	
Dry	Jun-04		**D**	**D**	0	
Wet	Jan-05		**D**	**D**	0	
Wet	Feb-05	1437	**BN**	**BN**	0	
Wet	Mar-05		**BN**	**BN**	0	
Wet	Apr-05		**BN**	**AN**	10	Gain
Wet	May-05		**BN**	**AN**	19	Loss
Wet	Jan-06		**AN**	**W**	8	Loss
Wet	Feb-06	2016	**AN**	**W**	7	Loss
Wet	Mar-06		**AN**	**W**	8	Loss
Wet	Apr-06		**W**	**W**	0	
Critical	Jan-07		**BN**	**AN**	0	
Critical	Feb-07	2001	**BN**	**AN**	0	
Critical	Mar-07		**BN**	**AN**	80	Loss
Critical	Apr-07		**BN**	**AN**	10	Loss
Critical	May-07		**BN**	**AN**	30	Loss
Critical	Feb-08	1531	**D**	**BN**	0	
Critical	Mar-08		**BN**	**BN**	0	
Critical	Apr-08		**D**	**D**	0	
Critical	May-08		**D**	**D**	0	
Below Normal	Feb-09	1208	**C**	**D**	0	
Below Normal	Mar-09		**D**	**D**	0	
Below Normal	Apr-09		**D**	**D**	0	
Below Normal	May-09		**D**	**D**	0	

From: Field, Randi C
To: "Barbara Byrne";
cc: Vasquez, Elizabeth A; Fujitani, Paul E; Kiteck, Elizabeth G; Washburn, Thuy T;
Subject: RE: WSP"s for June, July, (and August, if out)
Date: Wednesday, August 18, 2010 10:24:00 AM

Barb,

We would like to propose the following formulas for calculating the New Melones WSP's. This will accommodate the seasonal availability of runoff forecast data generated by DWR which Reclamation uses to calculate the WSP's. DWR's forecasts typically only run January through May. As the season progresses, the addition of actual inflow data is consistent with our historical treatment of the supply parameter. The exception is June where we propose to maintain the same magnitude of pulse initiated in May.

Month	**Calculation of the Water Supply Parameter (WSP) for Application to NMFS BO RPA III.1.3**
March	End of February New Melones Storage + March through September forecasted inflow (50% and 90% available)
April	End of February New Melones Storage + Actual March inflow + April through September forecasted inflow (50% and 90% available)
May	End of February New Melones Storage + Actual March and April inflow + May through September forecasted inflow (50% and 90% available)
June	Same WSP as May
July	End of February New Melones Storage + Actual March through June inflow + July through September forecasted inflow (50% only as forecasted in May)
August	End of February New Melones Storage + Actual March through July inflow + August through September forecasted inflow (50% only as forecasted in May)
September	End of February New Melones Storage + Actual March through August inflow + September forecasted inflow (50% only as forecasted in May)
October	End of February New Melones Storage + Actual March through September inflow
November	Same WSP as October
December	Same WSP as October
January	Projected End of February New Melones Storage + January through September inflow (50% and 90% available)
February	Projected End of February New Melones Storage + January through September inflow (50% and 90% available)

Using the above information, the recent WSP's result in the following indexes: [C-8]

Month	**90%**	**50%**	**Index**

May	1890	1979	Dry
Jun	1890	1979	Dry
Jul	NA	1940	Dry
Aug	NA	1960	Dry

For all of the months listed the index is the same for both Derek's table and the IPO.

Please let me know your comments or feedback.

Thank you,
Randi

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From: Barbara Byrne [mailto:Barbara.Byrne@noaa.gov]
Sent: Tuesday, August 17, 2010 1:20 PM
To: Field, Randi C
Cc: Vasquez, Elizabeth A
Subject: WSP's for June, July, (and August, if out)

Hi Randi –

Can you send me the New Melones WSP's for June, July & August, using both the 50% and 90% exceedance forecasts? Thanks.

Barb

_____
Barb Byrne
Fishery Biologist

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